JULY 23, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Miniaturization:

More Sales from Smaller Products... p. 78

✔ STRIKE IMPACT: LIGHT, BUT GROWING... p. 37

✔ LEADED STEELS MAKE THE GRADE... p. 123

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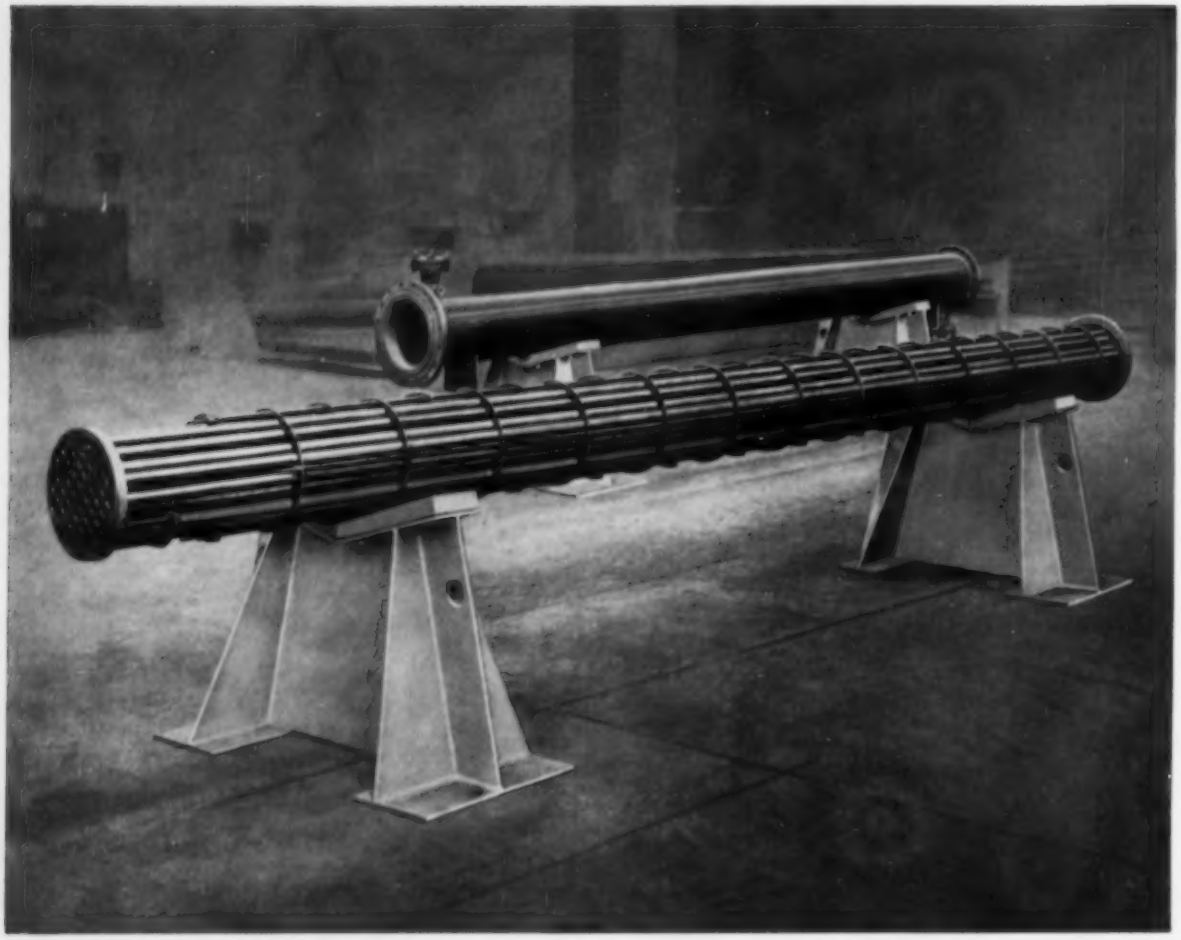


TITANIUM...Strongest Defense Against "All-Out" Attack

In the ceaseless battle against corrosion, B&W Seamless Titanium Tubing is providing a first and most powerful defense.

B&W Titanium Tubing is the practical result of many years of experience in making tubes of carbon steels, stainless steels, other alloys. It superbly combines maximum corrosion resistance and easy workability.

For example, the superior qualities of B&W Titanium Tubing made it the natural choice of Struthers Wells Corporation for fabricating the all-titanium heat exchanger shown above. This unit, now performing perfectly in service, is 12 ft. long, x 17½ inches diameter and weighs 2200 lbs.

This case, like many others, shows how B&W Seamless Titanium Tubing met the need and solved the problem for a fabricator.

Get answers to *your* questions on why to use . . . what to use . . . how to use titanium tubing . . . call on Mr. Tubes. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-5080(P)

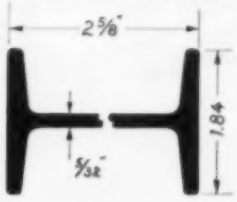
Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

These special bar sections are cutting costs for our customers

Product: **Underknife section for lawn-mower.**

Application: A leading manufacturer of power mowers specifies this special section for his reel-type mowers. After hardening and tempering, the underknife is sharpened and attached to the mower.

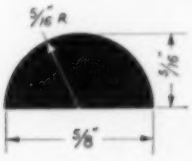
Results:
1. The section is hot-rolled to the precise contours required, making forming operations unnecessary.
2. Rolling the cutting edge eliminates costly grinding.



Product: **Track rail for overhead conveyor**

History: Customer formerly slit and capped a 6-in. I-beam to make this unusually small rail. This required numerous operations and resulted in some scrap loss. He substituted a Bethlehem section hot-rolled to his specifications.

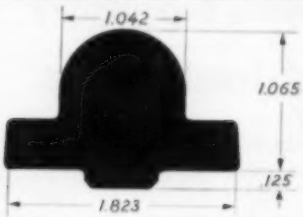
Results:
1. Unnecessary operations and scrap loss eliminated.
2. Customer has a neater, "custom-made" product.
3. Rail is more easily bent into curves.



Product: **Piano string hold-down bar**

History: Only a metal-plated half-round bar is considered attractive enough for this piano part. However, the as-rolled surface condition must be exceptionally fine, and the dimensions must be held with great precision. Bethlehem has supplied this section for well over 20 years.

Results:
1. Surface quality so good that a minimum of buffing is required for customer's plating operation.
2. Section has been rolled with extreme accuracy.



Product: **Universal joint trunnion bearing**

History: Formerly individually machined from flat bar stock. Now produced on automatic screw machines using as stock the hot-rolled section shown at left.

Results:
1. Approximately 10 pct saving in steel.
2. Machining costs cut by as much as $.05 per unit.
3. Faster production—one unit every 18 seconds.

Product: **Lading tie anchor for railroad cars**

History: This bar is used to secure bands which prevent shifting of loads in gondola cars. Customer formerly used a large press to offset round bars; he now uses this special section which does not require processing, and is welded directly to the cars.

Results: Bending operation completely eliminated. This resulted in:
a. Reduced production costs.
b. Much faster production.

Could hot-rolled special sections be used to advantage in the products you make? We'd like to discuss the possibilities with you. Just contact the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

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If you are locating beyond the gas mains, install a

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Philgas is a high-quality Phillips Petroleum Company product that you can absolutely depend on . . . for purity and cleanliness . . . for constant, easily controlled pressure. And with Philgas you get high thermal value at low cost.

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HOBART arc welders

NEW SIMPLIFICATION OF AUTOMATIC WELDING SPEEDS WORK ...LOWERS COSTS!

Don't overlook the big factor of speeding your welding operations. You'll be amazed at the savings made possible by fully automatic welding, using your own men to successfully do higher quality welding. No special experience necessary.

No complicated setups. No troublesome electronic or delicate electrical controls. The new Hobart "Simplified" automatic welder is definitely a valuable cost cutting tool in small shops as well as the larger plants in offsetting rising costs.

It's vitally important today to investigate new and better ways of speeding production. The advantages to be gained with automatic welding can be measured to show how Hobart's new, faster method of fabrication can lower your costs.

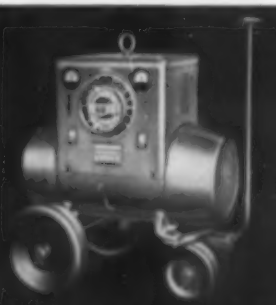
Why not check the coupon now, and get complete information on the new automatic welder to see how profitably it can work for you—no obligation. HOBART BROTHERS CO., BOX **ST-76,** TROY, OHIO, *phone 21223, one of the world's largest builders of arc welding equipment.*

CARBONAIR CUTTING and GOUGING

Makes quick work of cutting and gouging of all metals using carbon arc and compressed air

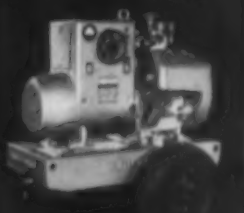
Hobart's Carbonair has been specially designed with plenty of power for fast cutting and gouging. Eliminates necessity for oxygen and acetylene tanks. Removes defects in castings, cuts gates and risers—cuts ferrous and non-ferrous metals the easy way in preparation for weldments. Write for bulletin A-365-E.

HOBART welding electrodes



Standard Electric Motor Drive

Standard Gas Engine Drive



Air cooled Gas Engine Drive

DC Rectifiers 300 & 400 Amp.

AC Transformers 180 to 500 Amp.

HOBART TROY OHIO WELDERS

HOBART'S New...faster WELDING ELECTRODES

You'll like these new, faster electrodes. All Hobart electrodes are precision made, rigidly inspected and tested to assure uniform high quality. You'll never know the real difference in electrodes until you've tried Hobart. Write for complete catalog.

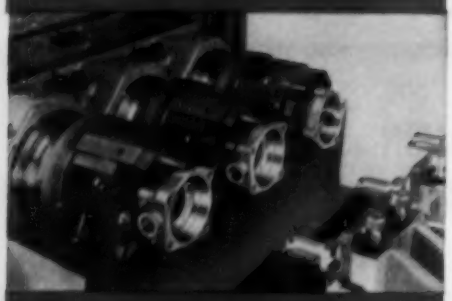
HOBART BROTHERS COMPANY, BOX ST-76, TROY, OHIO, U.S.A.

☐ Send me complete information on automatic welding.
☐ Carbonair cutting and gouging.
Also send information on your standard welders.
☐ Elec. Motor Dr. ☐ DC Rectifier ☐ AC transformer ☐ Gas Eng. Dr. (air cooled) ☐ Gas Eng. Dr. (water cooled) ☐ Information on the new welding electrodes.

Name_____ Position_____

Firm_____

Address_____



Showing parts mounted in the chuck. Without chuck changes, any of three parts having different exterior forms but identical interior contours can be accommodated.

Heavy lines denote surfaces machined. 12 operations are performed in one machine cycle.

INTRICATE CONTOURING IS FAST, ACCURATE ON

Ex-Cell-O's Cam Operated, Precision Boring Machine

Direct cam action—no levers—provides Ex-Cell-O Precision Boring Machines with better accuracy, versatility, speed and flexibility in difficult contouring operations.

In the application shown here—contouring an internal form in die-cast aluminum end covers—limits on diameters are held as close as plus or minus .0005 inch, and three work pieces are completed at a time. 12 separate operations are performed in one machine cycle, including precision boring, facing, chamfering and grooving.

Cams can be changed in minutes. Cam assembly swings out for quick, easy change of operation. All motors are outside the base.

Another Ex-Cell-O feature is the large chip chute, cast as an integral part of the base. There are no openings where chips or coolant can enter the base.

Contact your Ex-Cell-O representative or write direct for complete information.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-7

The Ex-Cell-O Style 312 Precision Boring Machine is operated by precision direct cam action. Because of the demand for this type of machine, a smaller model, the Ex-Cell-O Style 308, is now available.

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STEEL
The Metalworking Weekly

July 23, 1956 Vol. 139 No. 4

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This Sturdy Precision
Tool Grinder
BY EX-CELL-O

Style #4-A, is one of the newest in a complete line made by Ex-Cell-O for sharpening carbides, high speed steels, and cast alloys. All are double end models, equipped for face grinding on cup-type wheels, for efficient and economical conditioning of single-point tools.

XLO

Tables are big to give good support to the tools. They are easily adjustable.

There are Ex-Cell-O Tool Grinders to suit the needs of every shop, large or small. For data on this complete Tool Grinder line, write Ex-Cell-O in Detroit, or call your local Ex-Cell-O representative.

55-6

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CORPORATION
DETROIT 32, MICHIGAN

machines last longer...

Priced from $180.00

wear reduced 80% as much as with easy-to-move

TORIT DUST COLLECTORS

Dust causes wear, damages bearings, bedways, slides and saddles and other "sensitive" machine parts. Clean machines hold close tolerances better and need re-grinding or alignment only ¼ as often. In five years, users of Torit dust collectors save up to $1,600 in re-grinding the ways of the average grinder—and save hundreds of dollars *more* in down-time.

MANY COMPACT MODELS . . . all self-contained. Unitized for custom installation. More economical, usually more efficient than central (built-into-the-building) systems. For more information, write today to . . .

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311 Walnut Street,
St. Paul 2, Minn.

behind the scenes

Lift Editorial Hat

Sioux Indians, Maoris and Easter Islanders share with Associate Managing Editor Vance Bell a certain anatomical similarity: They are all dolichocephalics. In all fairness to Vance, it may be well to add that dolichocephalics are found among popes and kings, saints and sinners, artists and reporters, criminals and poets. The term is simply a high-class definition of a long head. Some anthropologists got together one time over a mess of skulls (what a way to pass the time!) and agreed that if they took the length of the skull as 100, the proportion of the breadth would make an excellent cephalic index. Vance falls into the dolichocephalic class, and he's very glad that he does, because when he looks for the rascal who stole his new hat from a restaurant the other day, all he has to do is check skulls for suspects.

"The only person who could wear my nice, new Panama hat," Vance groaned, "would be me, or some other guy with a long head. From now on, I'm going to sit in the balcony of this restaurant, and get a bird's-eye view of people's heads. I'm going to trail folks with long, narrow noggins to the hatracks, and if I don't get back my nice new Panama hat, it won't be because I didn't try."

. . . Ad Infinitum

In an address (The Fabulous Future of Metalworking) that he has delivered several times before industrial and advertising groups, Editor Walt Campbell mentions miniaturization. To illustrate his remarks, he shows a large picture of a hand holding a cigaret lighter that functions also as a radio—the lighter, of course; not the hand. Much of Walt's fine discourse is predicated on future developments, but right now, in some instances, we are actually stumbling over our own progress. Miniaturization, now: It is already upon us. This week STEEL prints a story (page 78) that is an up to the minute report on this interesting phase of industrial development.

One of the bars to miniaturization was the bulk of vacuum tubes, but after the appearance of transistors, there was nothing left to hinder the march toward microscopity—(if there is such a word, and we don't think there is) nothing, that is, except man himself. Things can't be made too small, because hands have to handle 'em, and what doth it profit a man if he maketh a gimmick so infinitesimal he can't even use it?

The gadget the man is measuring on the cover, holding it delicately in his micrometer, seems almost too small to worry about, doesn't it? It reminds us of the great scientific find made in the barren Green River Basin of western Wyoming a few years ago: a 3/16" jaw fragment of an 8-ounce shrew that died 55 million years ago. Now, you might think offhand that item was too small to consider, too, wouldn't you? Well, sir, that's where you're wrong. That little old shrew jawbone just turned out to be the top paleontological find of the year, that's all it did! So leave us, therefore treat miniaturization with the respect and awe it deserves.

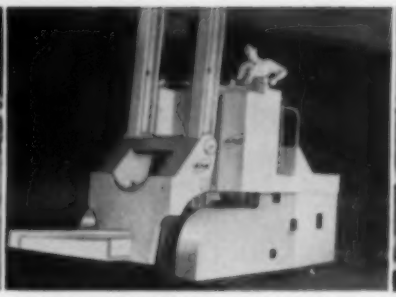
Grave Tones

We don't know why the resurrection of a shrew bone should suggest a cemetery, but it does. Out in Mt. Carmel Cemetery in Hillside, Ill., where once, long ago, a church bell on top of the main office building was rung to summon cemetery foremen, a 2-way radio system was recently installed. There are 25 miles of roadway in the park and a field force of 76 workers with their regular and special equipment. If the sexton wishes to get in touch with the assistant sexton, or a brace of star gravediggers, he simply gets on his 2-way radio. Walkie-talkies in a graveyard! Without implying any disrespect, it seems reasonable to assume that the dead shall arise in due course, not to the mighty notes of Gabriel's trumpet, but to the electronic summons from a loudspeaker.

Shrdlu

(Metalworking Outlook—Page 31)

1 *ELPAR Die Handler has separately operating pusher arms for fast, flexible die positioning.*

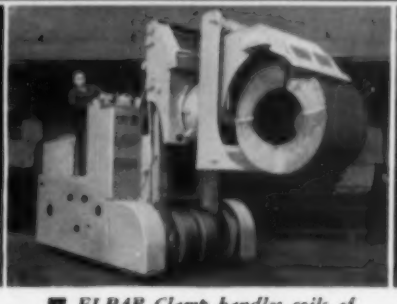


2 *New ELPAR Ram Truck has dual power plants to carry 40-ton loads readily.*

3 *Rotating Forks on ELPAR truck dump forgings into hopper of cleaning machine.*

TEN TRICKS WITH TRUCKS IN METAL-WORKING

4 *Special ELPAR truck safely pulls bearings from ends of steel mill rolls.*



5 *ELPAR Clamp handles coils of strip in any position from horizontal to vertical.*

6 *Unique ELPAR truck carries auto bodies swiftly, stores them on end to save space.*

7 *ELPAR Plow Attachment levels scrap in car, eliminates a dangerous manual job.*

Versatile ELPAR trucks are saving money on hundreds of special metal-working jobs. Elwell-Parker has 50 years experience in solving the unique problems of this field. ELPAR trucks have extra, built-in dependability so necessary in metal handling . . . You can save, too. Write us about applying these finer trucks to unusual jobs in your plant.

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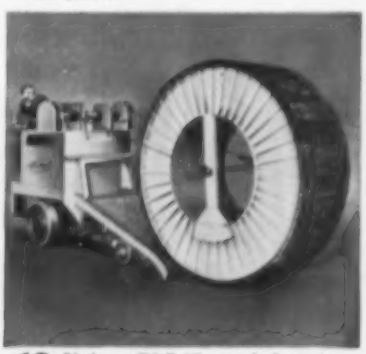
WRITE FOR NEW → GENERAL CATALOG

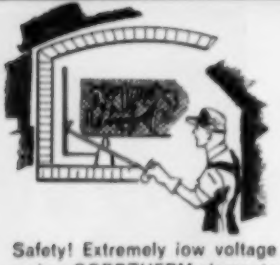
ELPAR
INDUSTRIAL TRUCKS

8 *ELPAR Foundry Truck puts cores right into oven where heat reaches 400° F.*

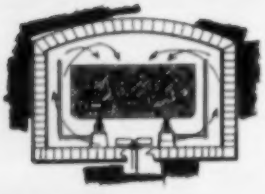
9 *Special forks lower hot load of annealing castings below floor into quench tank.*



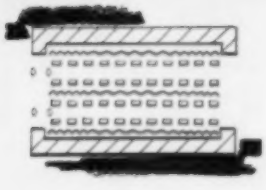
10 *Unique ELPAR truck has tipping platform and winch to handle huge cable reels.*



Safety! Extremely low voltage makes **CORRTHERM** elements completely safe. Let operator or work load bang it if they will. Neither element nor operator will be hurt.



CORRTHERM elements act as natural baffles to direct forced convection streams through the charge. The use of electric furnaces for carburizing and carbonitriding is now practical.



In continuous type furnaces **CORRTHERM** elements hang between lines of work as well as on side walls. Note how closer corrugations (at each end of element) compensate for incoming cold work and door losses.

NEVER BEFORE ANY ELECTRIC ELEMENT LIKE THIS NEW ONE BY LINDBERG

On the opposite page is a photograph of Lindberg's new CORRTHERM element for electric heat treating furnaces. You can see how radically advanced this element is over anything now used.

Wherever electricity is the preferable source of heat for metal treating the CORRTHERM element now makes its use practical, efficient and economical.

And this includes carburizing and carbonitriding furnaces, too! Problems created by the use of electricity in these types of furnaces are well known. CORRTHERM elements eliminate them completely. These facts tell you how and why:

LOW VOLTAGE: Operates at extremely low voltage. No leakage through carbon saturation. Around Lindberg we talk about it as the electric element "without any electricity...to speak of!"

ATMOSPHERE CIRCULATION: Elements act as baffles to direct circulation of convection streams.

SAFETY: Extremely low voltage also eliminates shock or short hazards.

DURABILITY: Watts density at all-time low. Element practically indestructible. Work load or operator's charging tool can't hurt it.

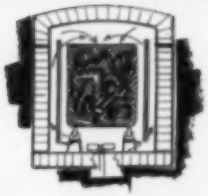
EASILY INSTALLED: Element is not enclosed, just hangs in furnace. No complicated mountings required.

CORRTHERM, Patent No. 2694740 (other patents pending), was developed in Lindberg laboratories, by Lindberg metallurgists and engineers. To find out just how its advantages can be applied to your heat treating processes get in touch with your Lindberg Field Representative. (See classified phone book.)

LINDBERG ENGINEERING COMPANY

2441 West Hubbard Street, Chicago 12, Illinois

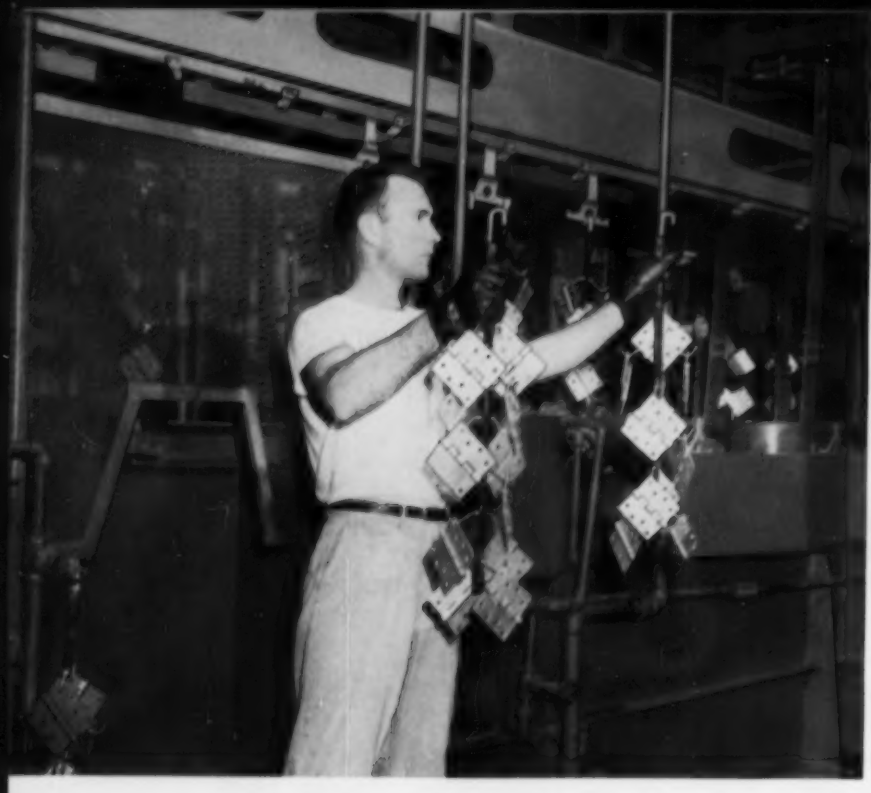
Los Angeles Plant: 11937 Regentview Ave., at Downey, California



No retort needed in pit-type carburizing furnace with CORRTHERM elements. Again see how elements serve as baffles to direct forced convection stream through charge.

CORRTHERM

by LINDBERG



PRODUCTION INCREASED— UNIT COSTS LOWERED with UDYLITE AUTOMATIC PLATING MACHINES

Each day, over twenty thousand door hinges are cadmium, copper and brass plated by three Udylite automatic machines owned by C. Hager & Sons Hinge Manufacturing Company, St. Louis, Missouri. Cadmium plating is for protection from rust and corrosion—the copper and brass plating for a gleaming, luxurious finish.

The Hager Company installed these machines five years ago when it was decided to eliminate their hand operations. Production has increased one hundred fifty percent with the Udylite Automatics—the finishes are more uniform—the rejects reduced to practically nil, and as with most Udylite machines, there is very little maintenance.

Have you checked your metal finishing operations lately? If you do plating, anodizing, blackening, or other types of metal finishing in volume, you should investigate the Udylite automatic equipment and Udylite finishing processes. They are known the world over.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

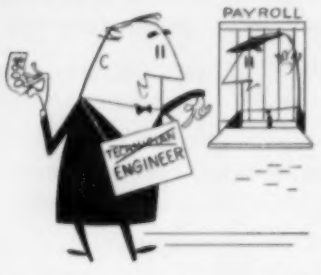
LETTERS
TO THE EDITORS

Tardy, but Complimentary

A little late with catching up with this particular issue, but my compliments on an excellent presentation in your 1956 Program for Management series, "Ideas for Industry" (Apr. 23, page 105). If possible, please send me four reprints of this article.

G. S. Nelson
Chief Tool Designer
Missile and Radar Division
Raytheon Mfg. Co.
Lowell, Mass.

Salary Figure Questioned



The article, "Extra Hands for Engineers," which appeared in the May 7 issue of STEEL (page 53) set our people thinking more realistically about the proper use of technicians. It supported their arguments for a more general use of technician talent.

The only feature of the article which seems a little out of line is the part dealing with salaries. The average figure given seems to fall in line with our general thinking. The figure of $600 per month might require some defining because it appears quite excessive. A highly experienced technician no longer carries the name of a technician but that of an engineer when he begins to earn $600 per month.

Personally I feel that technicians are an extremely important part of the general engineering effort in any industry. I feel their qualifications have been overlooked too often and in a sense it is fortunate we have reached the current situation with respect to manpower because it has helped to place the value of the technician in its proper light. The technician is an important part of the engineering team.

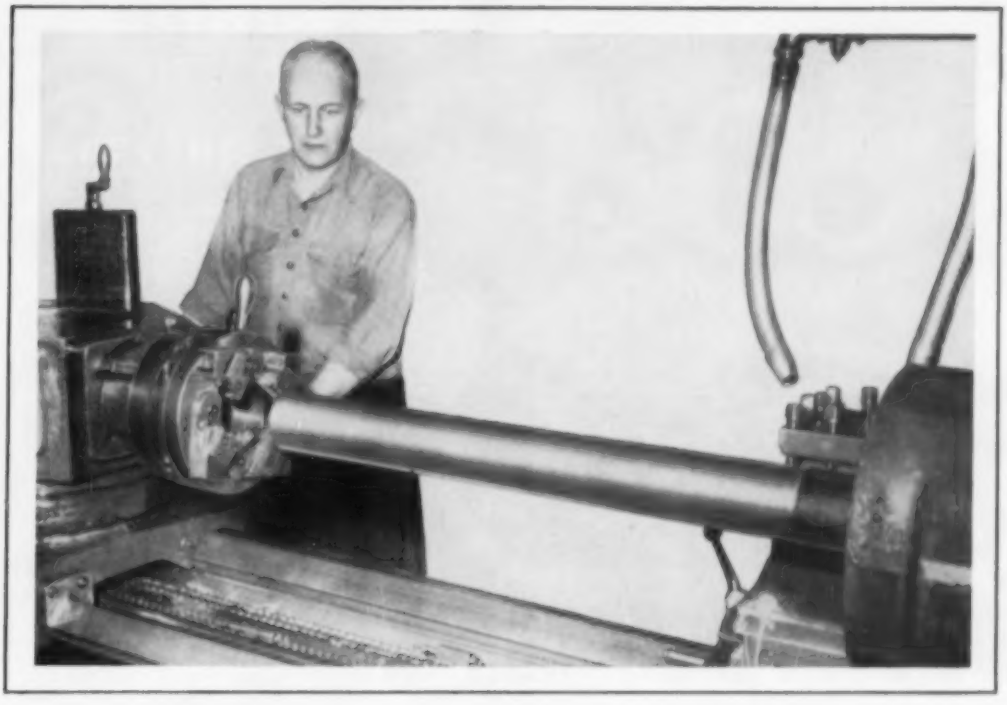
Joseph Waitkus
Assistant to the Technical Manager
Air Preheater Corp.
Wellsville, N. Y.

Going Back to November

My recent request for a copy of your article, "War on Wear" (Nov. 28, 1955, page 98), was answered by your Editorial Service Department and I enjoyed reading this article. My employment is with E. I. du Pont de Nemours & Co. as an engineer and my work is mainly concerned with wear problems, many of which parallel the problems mentioned in your article.

On page 101 you make reference to reducing metal to metal friction by elec-

(Please Turn to Page 12)



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4150 steel heat-treated to 28-32 Rockwell "C" is threaded to a Class 3 fit by a LANDMATIC 32 AX Head. Rugged tangential chasers provide long life and allow threading after heat treating. Special centering throats on these chasers eliminate the out-of-round condition common in long workpieces.

This stationary self-opening head is used on a 3A Warner & Swasey turret lathe to thread tie bars for plastic injection molding machines at the Reed Prentice Corp., Worcester, Mass.

The 32AX LANDMATIC Head will thread workpieces up to 4" in diameter through the bore, and cut 8 pitch or finer threads up to any practical length. By using oversize chaser holders short lengths of threads can be cut on larger workpieces up to 6¼" in diameter. A larger head, the 40AX, features a six-chaser design to give greater distribution of cut and greater support to large diameter workpieces. This head will cut threads up to a maximum of 9¼" in diameter with the same pitch limitations.

For more information on the 32AX LANDMATIC Head, send specifications and ask for Bulletin No. F-90.

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LETTERS

(Concluded from Page 10)

tropolishing. You refer to a 4 micron and a 0.3 micron surface and I'm wondering if you did not mean 4 micro and 0.3 micro. A micron is 0.00004 of an inch and a micro is 0.00001 of an inch, and microinch is the term generally used when referring to surface finishes. Your comment will be appreciated.

F. J. Penoza
Fluid & Applied Mechanics Group
Engineering Service Division
E. I. du Pont de Nemours & Co.
Wilmington, Del.

• *You probably are right in your guess that the phrase "microns rms" should read "microinches rms." We haven't been able to put our finger on the original source of information. However, the point still stands—that electropolishing is a method for refining an already supersmooth surface.*

Tubing Article Makes a Hit

We, being the largest distributor of mechanical tubing in the Southwest, would like to take this opportunity to commend you on the fine presentation made in your issue of June 4, (page 103), "Tubing Sells Itself to Machinists." We think that it was presented so well that we would like to reprint the article and distribute it among our customers and to our sales personnel.

Martin A. Noyd
Advertising Manager
Vinson Steel & Aluminum Co.
Dallas

If reprints are still available, we would appreciate receiving 30 to give to our salesmen.

Stark Smith
Sales Promotion Manager
C. A. Roberts Co.
Franklin Park, Ill.

• *To Mr. Noyd: Permission granted.*

Beyond the 'New Horizons'

I was much interested in the information contained in your recent article, "Metalworking's New Horizons" (June 18, page 137). I feel certain that this article will be of interest to several of our product managers, so would appreciate it if you could forward me six more copies of this reprint.

Richard W. Smith
American Air Filter Co. Inc.
Louisville

We would appreciate your forwarding us about 24 more copies of this reprint. It will be distributed to our salesmen and key personnel.

Nelson L. Ellis
Sales Promotion Manager
Eastern Stainless Steel Corp.
Baltimore

Retirement Stories 'Pertinent'

Please send me an extra copy of "Workers Prepare To Retire" (June 11, page 69) along with a copy of "New Look in Retirement" (June 4, page 61). Both articles are pertinent to our situation here.

E. W. Gressle
Industrial Relations Manager
Warner & Swasey Co.
Cleveland

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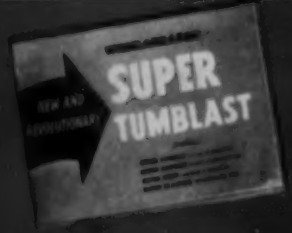

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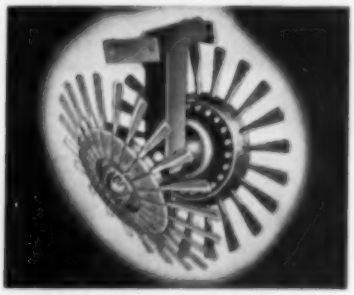

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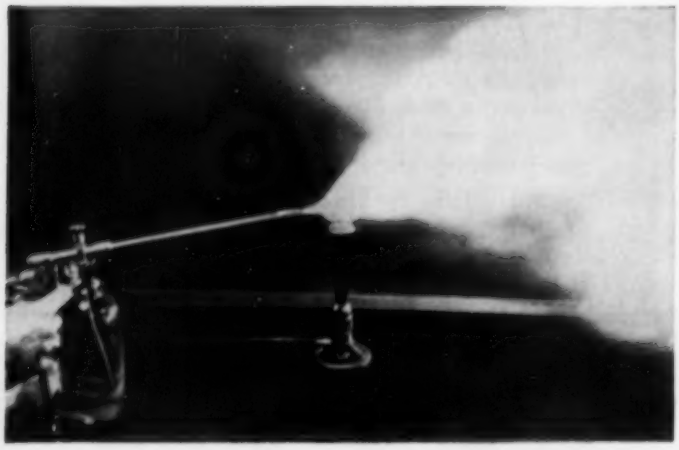
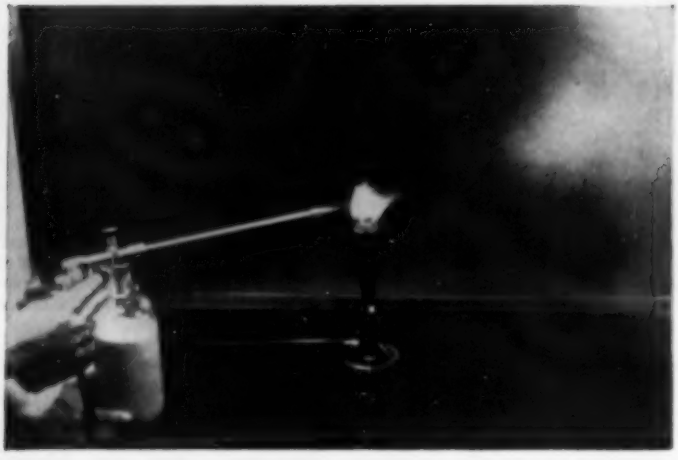


This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.

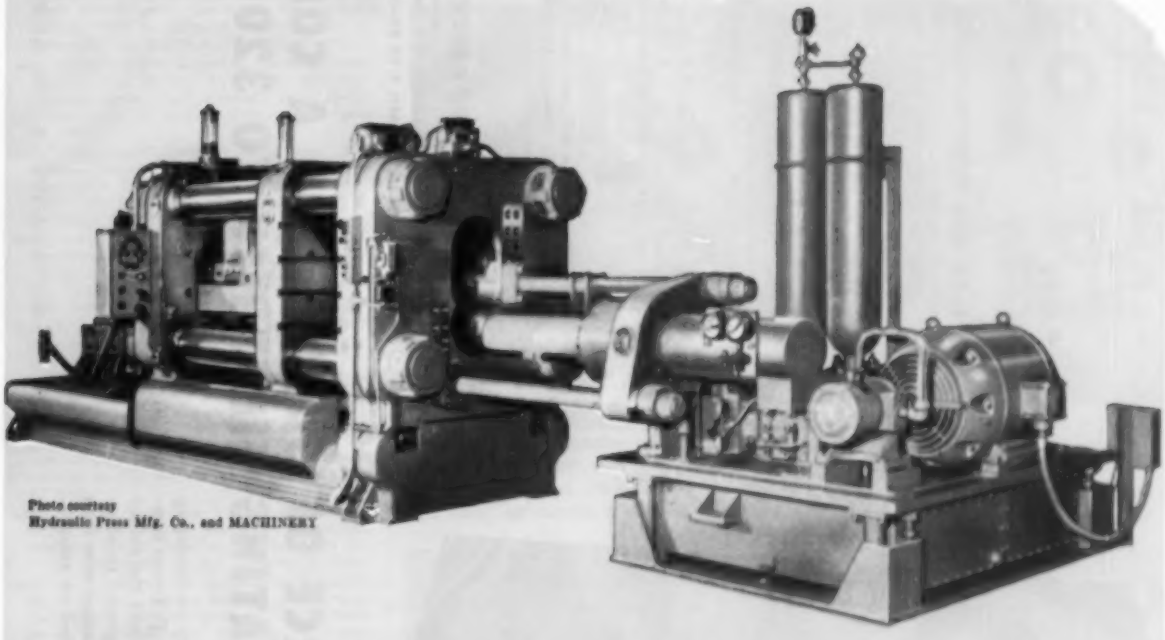


In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.

SHELL IRUS FLUID 902

Oil-Base fire-resistant FLUID

SHELL IRUS FLUID 902



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July 23-28, National Tool & Die Manufacturers Association: Summer meeting, Stanley hotel, Estes Park, Colo. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 6-8, Society of Automotive Engineers Inc.: National west coast meeting, Mark Hopkins hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 7-8, National Screw Machine Products Association: National sales conference, Wade Park Manor hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Aug. 21-24, Western Electronic Show and Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: Wescon, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and materials exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 12-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

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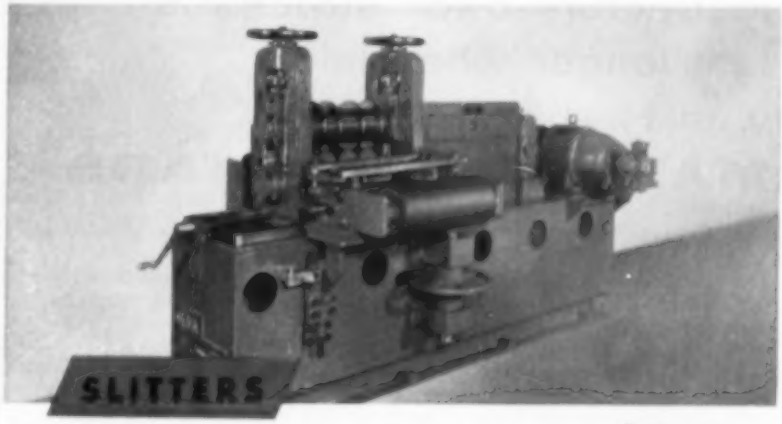

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Cold-setting chrome base mortar, highly resistant to various corrosive fluxes. It is especially suited for use with basic refractories. In many applications where corrosive action is severe, THERMOLITH serves the purpose better than other mortars for laying many classes of alumina-silica brick.

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A heat-setting silica cement of unusually high refractoriness. It is particularly adapted for laying Vega super-duty silica brick and other silica refractories for applications involving severe operating conditions.

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the owner likes living with Stainless Steel. It's always gleaming and beautiful, cleans with a wipe, and lasts forever. And, to complement her kitchen she loves to own those shiny pots, pans, tableware, and appliances, all made of Stainless Steel.

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(Advertisement)

How the Steel Industry Is Fighting Air Pollution

When the public hears about dust and fume control it is often in terms of what has *not* been done. It is important that they should also know what *has* been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. *First of all, how can you measure the progress of dust and fume control in the iron and steel industry?*

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. *Do these figures show an increasing interest in this high efficiency equipment?*

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. *But can't you attribute this growth to the increase in steel-making capacity?*

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. *In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?*

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. *What about new applications?*

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. *I understand your Cottrells are used on some sintering machines now. Is this true?*

A. Yes, we have three in operation and more under construction.

Q. *How about scarfing machines?*

A. This is a recent application which has worked out very satisfactorily. Two precipitators are now in operation on this application.

Q. *Has anything been done on such problems as iron cupolas, electric furnaces, and ferromanganese blast furnaces?*

A. Yes. Installations have been made on all these problems.

Q. *How do you go about developing these new applications?*

A. We work very closely with our customers on these new projects. Our laboratory is a big help, and our 40 years of pilot plant experience plus over 2,000 precipitators give us the kind of experience that leads to the successful engineering of projects like these.

If you would like to have more information about these applications, or if you want to investigate the possibility of using precipitators on other equipment, our nearest representative will be glad to call on you.

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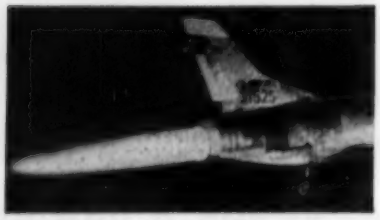

When heat's on. Few metals match Inconel nickel-chromium alloy in its resistance to high temperatures. In a jet plane flame tube, Inconel retains stability despite white heat.

Home front duty. Inconel is widely used in the control mechanisms of pop-up toasters and other familiar home appliances. Operating temperatures reach 600°F., so working parts including main switch, relay and springs are made of Inconel.

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Automotive engineers predict the day is not far off when you'll be seeing on the road . . .

Trucks . . . passenger cars . . . buses . . . all powered by gas turbine engines. Engines similar to those in jet aircraft!

It's an exciting prospect. But not yet a reality, for certain technical problems must still be ironed out. One of them involves the search for economical, heat-resisting alloys. They must be strong and tough . . . able to stand red heat . . . and not go to pieces at sudden changes in temperature.

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We're working to help the automotive engineers now. *And when gas turbine autos and trucks hit the road commercially, you can be sure nickel alloys will have made it possible!*

Do you have a problem finding a metal to withstand destructive service? The answer to it may be one of the Inco Nickel Alloys. Our free booklet, *Standard Alloys for Special Problems,* covers their physical and mechanical properties . . . fabrication . . . forms . . . applications. Write for it. The International Nickel Company, Inc., 67 Wall Street, New York 5, N.Y.

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Metalworking Outlook

Auto Firms Supply Steel

Ford and General Motors are providing steel for some of their suppliers. Ford's metal comes from its own Rouge plant. GM is supplying steel from its large inventories. Its Fisher Body Division, for example, is believed to have had as much as six months' stocks of some products before the strike.

U.S. Modifies Warehouse Order

Business & Defense Services Administration has modified its original freeze order on certain warehoused steels. Effective July 23, nondefense users will be put on a weekly quantity quota of the products affected (see STEEL, July 16, page 83, for list) when the distributor's stocks fall below 50 per cent of his June 30 inventory level. The order formerly limited quantity per order, but left a loophole in not limiting the number of orders. The amendment also adds carbon pipe, tubing, bars and bar shapes (except reinforcing) to the critical list.

Ford To Start Changeover

Ford Motor Co. will start model changeover operations late this month. The switch to 1957 lines will take until mid-September. Layoffs at its Detroit plants during that period will affect an average of 5100 weekly, about 15 per cent of the labor force. Most employees will lose three weeks' work, compared with two weeks during the transition to 1956 cars.

Steel Expansion Goals Studied

Federal mobilization men are studying expansion goals in steel structurals and plates. Look for a move in a few weeks to establish a new goal for structurals and to enlarge the one for plates. The decisions would make it easier for industry to get fast amortization. Coming up in about six months is a study of fast amortization for the whole steel industry. Most projects aren't eligible now. Facing tough sledding on a request for fast writeoff, for example, is the Jones & Laughlin Steel Corp. application on its proposed Texas mill to make seamless pipe (STEEL, July 9, page 57). The only chance this deal has of approval is under a special goal allowing fast writeoff "for production facilities for military and atomic energy procurement." The regular seamless pipe goal is closed.

Memo on Nickel

Watch for another announcement of nickel expansion, probably to come this week . . . Several U.S. firms are interested in undertaking a nickel recovery project in the Philippines. The reserves there of nickel-bearing laterite ores are estimated at 550 million tons, containing 4.4 million tons of nickel. Tests of the deposits are now going on, although some experts

Technical Outlook—p. 77 Market Outlook—p. 109

point out that it takes four or five years to achieve substantial production when starting from scratch, as would be the case in the Philippines.

Segregation Union Loses

One of the few groups that has actually pulled out of the AFL-CIO over the segregation question has just had a defeat. Employees of Butler Mfg. Co., Birmingham, have voted to retain Local 539 of International Association of Bridge, Structural & Ornamental Iron Workers, AFL-CIO, as a bargaining agent. Loser was the new independent Southern Fabricating & Steelworkers, Local No. 1.

Spur for Continuous Casting

Although Inland Steel Co. turned down continuous casting of carbon steels, at least for the time being, look for the process to be used elsewhere, probably in a smaller project than considered by Inland. Koppers Co. and Allegheny Ludlum Steel Corp. say new data unearthed as a result of Inland's tests will spur eventual adoption of the process. Koppers and Allegheny Ludlum have an interest in Continuous Metalcast Co. and have fostered development of the method of changing molten steel to molded steel in a continuously moving process.

Handling Equipment Sales Up

Sales of material handling equipment may hit $1.5 billion this year, compared with $1.2 billion in 1955. New orders are averaging more than 22 per cent higher than last year's, reports Material Handling Institute, Pittsburgh.

Bonanza in Extrusion Machinery

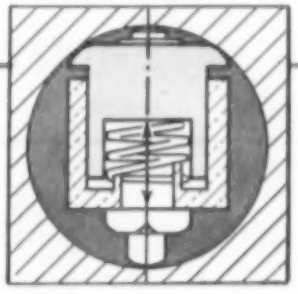
Keep your eye on the market for extrusion equipment (page 42). It's growing sensationally, not only for the many small nonferrous extruders, but for big companies as well. Kaiser Aluminum & Chemical Corp. is investing $6 million more for extrusion at Halethorpe, Md. Reynolds Metals Co. will expand extrusion capacity 20 per cent from its present level of 47,000 tons in the next three years. Among other developments, Aluminum Co. of America is installing another 14,000-ton press at Lafayette, Ind.

Straws in the Wind

Harvey Machine Co. Inc. has completed all financial and contractual arrangements for construction of its 54,000-ton aluminum reduction plant at The Dalles, Oreg. . . . B. F. Goodrich Co. and Goodyear Tire & Rubber Co. last week signed new contracts with the United Rubber Workers that incorporated a Supplemental Unemployment Benefit plan . . . August Thyssen-Huette A.G., West German steel company, has received $10 million in credit from the Export-Import Bank to buy equipment and technical help in the U.S. . . . Steep Rock Iron Mines Ltd. will spend $25 million to open three new mines which should be in production by 1960 . . . Gross national product should easily exceed $400 billion in 1956; the annual rate topped $403 billion in the first and second quarters and won't drop below $400 billion in the third quarter, despite the steel strike . . . Nonfarm housing starts declined a little more than seasonally in June to 104,000 units.

YOU SET IT DIRECTLY TO GAGE BLOCKS or with a micrometer . . .

Precise Centralization is Built-in



Positive centralization. Single plunger eliminates off-center location, assures precise alignment of centralizers and sensitive contact.

You can set this gage to gage blocks or micrometers with perfect assurance that when you place the gage in the hole the contacts will locate precisely on the true diameter.

Instead of using two separate centralizing plungers which might respond unequally to a common source of pressure, thereby making centralization inaccurate, the 1250 Series Bore Gages have a single, large, spherically radiused plunger which contacts the circumference of the hole at two points. The generous bearing surfaces assure precise movement of the plunger so that pressure is exerted equally at each point of contact, causing the gaging head to seat with greater accuracy on the true diameter of the hole.

At time of assembly, the sensitive and reference contacts of each gage are radiused precisely concentric with the plunger. This provides much greater accuracy than can be actually obtained by attempting to align a sensitive contact with two separate plungers. Even when the gage is unintentionally cocked laterally, it still holds its accurate centralization. Write for complete details.

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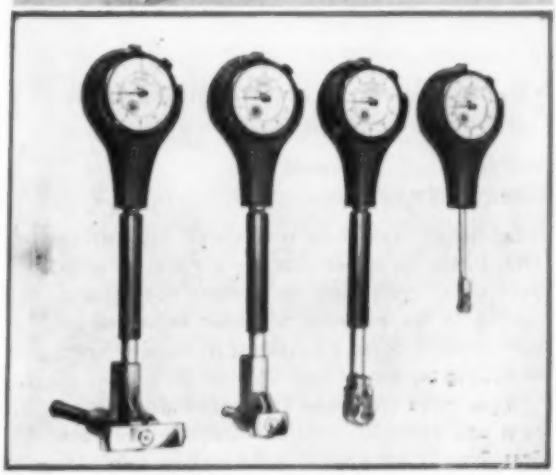

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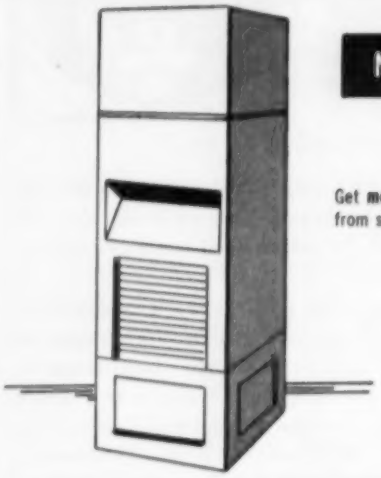
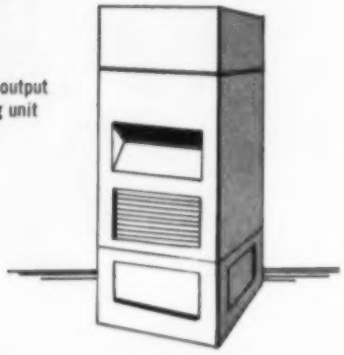


Now with ALUMINIZED STEEL

Get **more** BTU output from same size unit

Get present BTU output from **space-saving** unit



New A.G.A. approval requirements permit use of hot-dip aluminum coated steel at operating temperatures up to 1030°F, plus room temperature, in heating elements of gas-fired heating equipment. This is an increase of 225°F over the old maximum.

These new approval requirements open the door to manufacturers who want to take full advantage of the heat- and corrosion-resisting properties of Armco ALUMINIZED STEEL Type 1. If you make gas-fired heating units, here's what this special aluminum coated steel offers you:

- **more BTU's from same size unit**
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How Much Inflation?

With strong inflationary forces again at work, you in management face the problem of estimating how much inflation is ahead, how it will affect your business and what to do about it. Here are some of the factors tugging at the economy:

Total production of goods and services (gross national product) has a good chance of reaching an annual rate of $405 billion to $410 billion in the fourth quarter unless the effects of the steel strike bite deeply. It already had reached a record annual rate of $403.4 billion in the first quarter and is headed for $500 billion a year in less than ten years.

Bank credit currently is a shade easier, although Federal Reserve member banks have stuck to their increased rediscount rates (ten at 2¾ per cent, two at 3 per cent). Bank deposits have edged upward, commercial loans are down and personal finance companies are less interested in borrowing.

Just before the steel strike, U. S. employment had reached a high of 65.5 million. Inevitably, the shortage of skilled workers will get worse in the next few years due to the vagaries of the birth rate pattern and the greater pressure for increased industrial production.

The wage pattern seems pretty well fixed for the next few years. Companies that have not already raised wages this year can expect to settle for a wage and fringe "package" of anywhere from 15 to 25 cents an hour, plus additional "packages" in 1957 and 1958.

Reports from several hundred STEEL readers show that the pattern is not so well fixed on prices. Some companies weeks ago anticipated the steel wage price boost by raising prices 5 to 10 per cent. Others are waiting to get a more precise picture of their own wage and material costs before marking up prices.

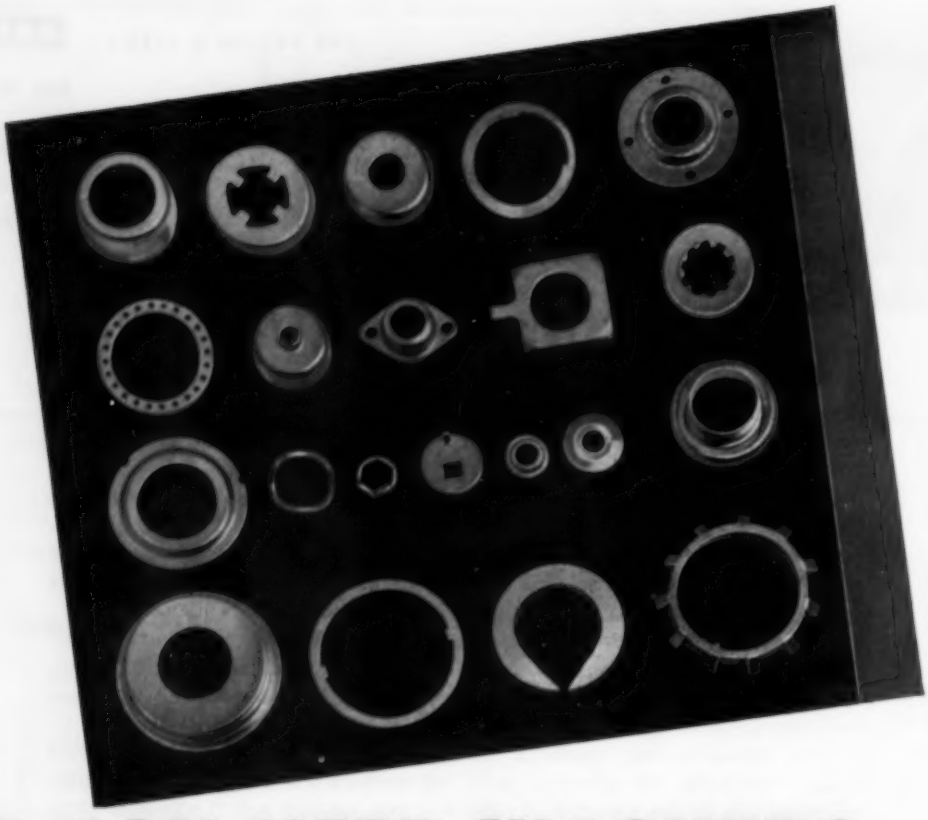
Still others (like the metal wall tile maker who competes with plastic and ceramic tile) are caught in a price squeeze. A fourth group is working feverishly on production efficiencies and improved product design in an effort to hold the price line. Across the board, the metalworking industry expects prices will be 3.5 per cent higher in the second half of 1956 than in the first half.

In government, at least three factors will be mildly inflationary: Prospects for a stable government for another four years; almost certain cuts in taxes in fiscal year 1957 and continued heavy military expenditures.

Measured by its purchasing power, the dollar now is worth only 52.1 cents compared with pre-World War II. Anyway you look at it, you're in for at least 2 per cent inflation a year.

It means that management has the troublesome chore of keeping prices in line with costs, yet keeping a weather eye out for competition in our complicated world.

Irwin H. Such
EDITOR-IN-CHIEF



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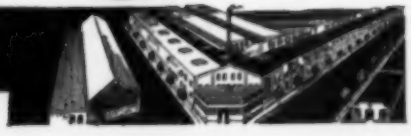
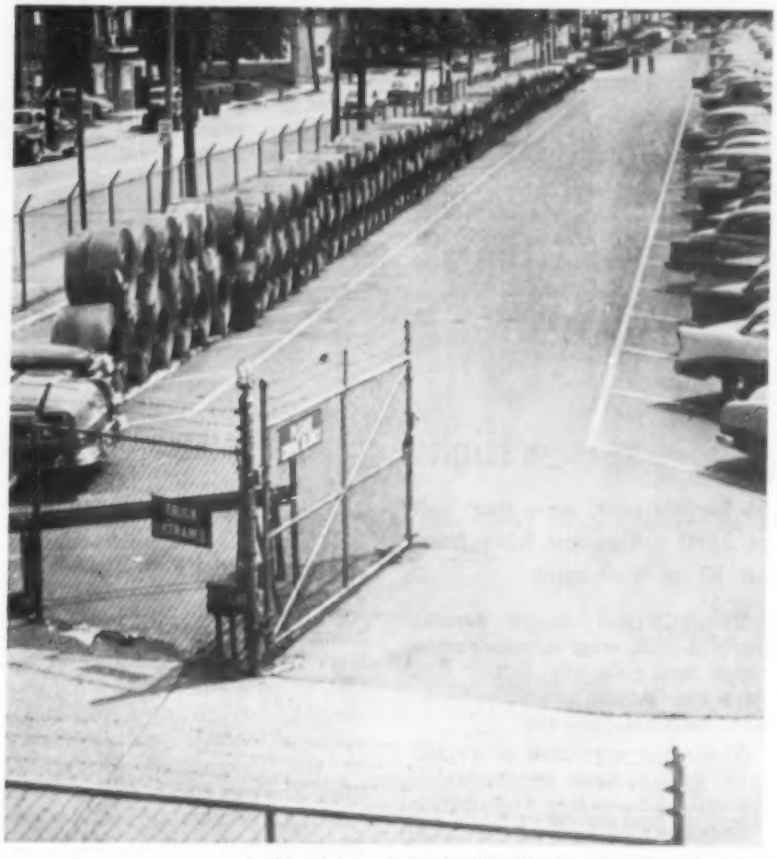




Parking-lot steel stocks like this are fast disappearing

Stop-Strike Forces Gather

Crystal-balling the strike: Few see a walkout of less than 30 days. After that the heat will be on to end it by Aug. 15. Important coming event: The Democratic convention

THE RENT will be due Aug. 1 for 500,000 striking steelworkers. The percentage of steel-using plants closed for the duration will jump from 2.5 per cent to 15 per cent during the critical period from Aug. 1 to Aug. 15 (STEEL, July 16, p. 81).

Those are two of the pressures to contain the steel strike within 45 days.

Political Ball—The date many are afraid of: Aug. 13, when the Democratic party convenes to nominate its presidential candidate. Generally, the steel companies don't expect any immediate results from talks with the government's negotiators (who have been in on the talks since July 12); however, the heat will be on to end the strike before the Democratic convention.

Otherwise, the Democrats would have some good talking points about industry and labor suffering under a Republican administration "dominated by businessmen."

Taft-Hartley—If the steel industry is back at work on a strong basis by convention time, the Republicans will be able to point with pride at a record of no interference by government in the internal affairs of management and labor.

To invoke the 80-day injunction feature of the Taft-Hartley Act at the right time could put the steelworkers back to work just after the convention starts and keep them there until just after the national elections. That's not good enough though: The administration wants a settlement and not a postponement, if it can get it.

Vox Populi—Public pressure to end the strike probably won't bloom before the middle of August. Between Aug. 15 and 30, another 10 per cent of steel-using plants will close, and the percentage of plants curtailing production will rise from 20 per cent to 30 per cent. Then shortages of consumer goods may be a fact, and unemployment in metal-using industries will be heavy.

Another popular voice not to be forgotten: The members of the United Steelworkers of America. Even with "payments deferred until the strike is over" by the finance companies, and dollars and food from the union fund, the workers probably will be satisfied with their vacation and looking forward to their $100-a-week pay checks again.

The Bulwark—The economy's bulwark, construction, has been affected, reports L. Abbett Post, executive vice president, American Institute of Steel Construction. Big fabricators like U.S. Steel Corp.'s American Bridge Division and Bethlehem Steel Corp. are closed.

Smaller companies have enough

Strike's Cost:

July 1 to Date

(in millions)

In steel product sales	$660
In steelworkers' wages	150
In other wages	21
Total	$831

material on hand to last until Aug. 1. After that, says Mr. Post, "Our industry will be practically shut down."

Despite the mounting pressures to end the strike, no one seems to have gotten too excited; some even think the strike might jazz up the economy for a full-steam fourth quarter.

Inventory Boom—After the 1952 strike, a big recovery factor was the inventory boom. The same thing may occur this time with the economy as a whole definitely bullish. The new highway program is just one thing waiting for the strike to end.

Capital expenditures deferred from the first half to the second half also get the recovery off to a flying start.

Secretary of Commerce Sinclair Weeks believes the impact of the strike has been "hardly noticeable." Other top governmental economists report a 30-day strike would bring no important damage to the economy as a whole.

Certainly the stock market is keeping on course: In the past five weeks (including three strike weeks), the market has risen steadily to come within easy distance of its all-time high prior to President Eisenhower's illness.

Strike Recovery — To get the steel industry back to capacity production as soon as the strike ends is a tremendous job. Depending on the length of the strike, it will take from one week to 30 days to do it.

If the strike ends by Aug. 1, you can hope to see production within one week and near-capacity operations within two weeks. The Institute of Scrap Iron & Steel Inc. says some struck mills are having dealers ship scrap to concentration points outside the mills so that the material will be available immediately when the strike ends.

Strike Threat in Aluminum?

Unless steel negotiations are ended soon, there may be some danger of a strike in the basic aluminum industry.

Aluminum Co. of America, Pittsburgh, has entered negotiations with its two major unions, the United Steelworkers of America and the Aluminum Workers International Union of the AFL-CIO (the two groups have never merged). The former represents 18,000 and the latter some 11,000 of Alcoa's employees. Contracts with both expire at end of this month.

Alcoa officials say that talks got off to a sluggish start, as union officials waited for a better indication of the steel settlement. They want the same benefits. If steel talks last through the month, aluminum union officials might stall too long. Then there might be no time left to agree on contract terms.

Wages at New Highs

So far this year, more than half of 1880 settlements have been for 10 cents or more

REFLECTING record earning levels in 1955, wage increases negotiated during the first half of 1956 were the largest since the wage stabilization days of 1951.

That's the conclusion of a quarterly survey made by Bureau of National Affairs Inc., Washington.

Detail—Over half of the 1880 wage settlements surveyed in the last six months brought increases of 10 cents an hour or more. Only 30 per cent did so in 1955. The median (middlemost) increase jumped from 8.7 cents an hour in the first quarter of 1956 to 10.6 cents in the second. Over-all median for the half-year stood at 10.2 cents, up 2.6 cents from 1955's gain.

In both manufacturing and nonmanufacturing industries, the heaviest concentration of settlements was in the 10 to 12 cents an hour category. In nonmanufacturing, however, 36 per cent of the settlements were for more than 12 cents, as opposed to only 17 per cent in manufacturing. One reason: At the start of the second quarter, there was a seasonal increase in the number of construction settlements. The biggest single group of these came in at over 15 cents, more than 50 per cent were above 12 cents.

Pluses—Deferred increases, to become effective a year or more after the initial settlement, were found in 28 per cent of the first-half agreements. Some 40 per cent of nonmanufacturing contracts incorporated them, compared with 22 per cent of manufacturing contracts.

New or improved pension and insurance provisions continue to head the list of fringe benefits. Here, bigger gains were won in manufacturing industries. Twenty-one of the manufacturing contracts provided some type of Supplementary Unemployment Benefit, compared with three SUB grants among nonmanufacturing contracts.

The largest median increase (11.1 cents) reports BNA, was granted in the West Coast area. The North Central and New England regions were next highest, with a 10.3-cent median. The Southeast was lowest, with 9.3.

Wisconsin Steel Reprieved

A threatened strike of 4300 union employees at International Harvester Co.'s Wisconsin Steel Co., South Chicago, Ill., was averted July 13 when representatives of the company and officers of the independent Progressive Steel Workers Union agreed to extend indefinitely the contract expiring at midnight July 15.

Before the extension was arranged, employees had voted 2039 to 731 to authorize the union to call a strike if no agreement on a new contract was reached. It is understood the company granted certain undisclosed considerations and the union agreed to give five days' notice before any strike is called.

The union is demanding a 25-cent an hour wage increase and double time for Saturday and Sunday work. The company has paid time and one-half for Sunday work for years.

Union officials say agreement has been reached on some nonwage issues. The union seeks a guarantee against loss of earnings if new piecework or incentive rates should be installed by the company. Present contract has such a guarantee for three months but the union is seeking one for life of the new contract.

Last strike against Wisconsin Steel was in 1947 and lasted one week.

NEA

While pickets play at steel companies' gates, their supervisors get extra training

Strike Brings Training

Steel company supervisors and executives are taking special training courses these days. Some firms are encouraging vacations; few salaried personnel will be laid off

MONDAY morning, July 2, some 3000 of Republic Steel Corp.'s supervisory personnel began special training programs. Designed to take up any slack in work for the strike's duration, the program has proved successful in past work stoppages.

It isn't compulsory. White collar men are encouraged to take their vacations while the strike is on.

Be Prepared—During other steel strikes, other steel companies have conducted similar programs, but Republic was the first to get its going this year.

Commented a company spokesman: "When they started banking the furnaces, we started to put our program for salaried workers into operation. We've had experience in this business."

Subject Matter — The program includes a wide variety of subjects: Techniques of blast furnace operation, work simplification, safety and industrial relations.

"We emphasize programs that we haven't been able to hit hard enough during the normal course of operations," says Republic.

Speakers from seven Republic centers throughout the country are also available to any Republic facility desiring them. Local autonomy is the rule: The company's head office in Cleveland does not specify subjects to be included in the program.

Vacations—Some firms are encouraging vacations like Republic, but there doesn't seem to be much pressure on an industry-wide basis. Reported a spokesman for American Steel & Wire Division, U. S. Steel Corp.: "Some white collar workers are taking vacations now just to get them out of the way, but there is no pressure of any sort."

Exception—Youngstown Sheet & Tube Co. has urged employees to take vacations during the strike: "The company wants all employees to be on the job when it enters the confusing period immediately after the strike."

With the strike now over three weeks old, some steel companies besides Republic are preparing special plans for their salaried workers.

Inland Steel Co. has formed a committee of office supervisors to set up plans which may appear appropriate.

Furloughs—U. S. Steel Corp. is intensifying its training program for supervisory workers by stepping up classroom work. Some white collar workers, such as payroll clerks, may be laid off.

Another steel company will furlough some salaried workers, but only as a last resort, after shifting them to any job available.

Cleveland Pneumatic Settles

The six-week strike at Cleveland Pneumatic Tool Co., Cleveland, was settled last week. The company is one of the nation's largest makers of aircraft landing gear.

Both sides compromised. The union settled for management's wage offer of 11 cents, rather than the 15 cents it had asked. Management, on the other hand, agreed to limit its subcontracting.

Indexes Show Productivity Climb

(1947 = 100)

	1953	1952	1951	1950	1949	1939
Physical Output per Man-Hour						
Durable Goods Industries	124.5	120.6	119.6	122.0	111.0	92.9
Nondurable Goods Industries	120.1	116.9	114.7	112.5	105.9	98.8
Total Manufacturing	122.7	119.1	117.5	117.7	108.6	96.0
Net Output per Man-Hour*						
Total Manufacturing	122.4	117.7	116.2	111.9	105.5	88.7

Source: Bureau of Labor Statistics
*Relates value added by manufacture to man-hours

Productivity Rises

Prediction: Future gains will continue the yearly rise of 3 to 3½-per cent experienced since World War II. No boost expected as a result of automation

"PRODUCTIVITY is a long-run factor which lies under the surface. It is a sound, firm and solid force which permeates the American economy." So stated Ewan Clague, commissioner of labor statistics, before the National Industrial Conference Board, New York.

More spectacular are preliminary figures for the productivity rise during 1954 and 1955. Productivity was about 10 per cent higher in 1955 than in 1953. The bigger increase came in 1955.

The Trends—Over the six years from 1947 to 1953, productivity has increased between 3 and 3½-per cent a year. Before then the long-term gain was about 2 per cent annually. War disrupts long-term trends of productivity. During World War I there was no gain in productivity and the increase in productivity from 1939 to 1947 was only about 1 per cent annually.

After a war there is a sharp increase in productivity. A year of business recovery also shows big gains.

Automation—Mr. Clague points out that productivity rose faster from 1919 to 1925 than it did from 1947 to 1953. He concludes that automation has had little effect on productivity increases.

George G. Hagedorn, associate director of research, National Association of Manufacturers, New York, thinks that the "turn to automation is simply an indication that we have used up the productivity growth possibilities of the older forms of technologies."

Work or Play?—Mr. Hagedorn expects people will take the benefits of productivity increases in the form of a higher standard of living rather than in increased leisure. He puts it this way: "If a wife is given the choice between having a new rug in the living room and having her man around the house more hours per day, she will choose the rug."

Real average hourly earnings have kept step with rising output per man-hour. John T. Dunlop, professor of economics at Harvard University, thinks that the 19.5 per cent increase in real wages from 1947 to 1953, plus fringe benefits, total slightly more than the rise in productivity.

New Source for Electrodes

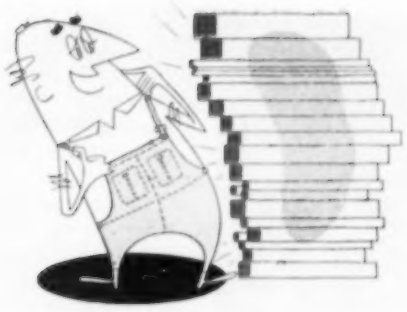
Electrodes for electric steelmaking furnaces and aluminum potlines may come soon from Gilsonite, a mineral.

American Gilsonite Co., Salt Lake City, Utah, has a $16 million project under way in Utah and Colorado to convert Gilsonite into high octane gasoline, fuel oil and high purity electrolytic coke. From the latter would come electrodes.

Gilsonite is a black, solid, high purity asphalt. The name comes from Samuel Gilson, who discovered the mineral about 1875.

American Gilsonite will install wet mining equipment at its Bonanza, Utah, mines, from which a 71-mile 6-in. pipeline will carry the mined Gilsonite in slurry to the refinery. The processing plant, near Grand Junction, Colo., will start operating next spring.

American Gilsonite Co. is a joint affiliate of Barber Oil Corp. and Standard Oil Co. of California.



Even color blindness brings problems in steel marking as . . .

Headaches Grow for Coders

A COMMITTEE of the American Iron & Steel Institute, working with the Defense department on steel marking codes, plans to meet Aug. 14 in Cleveland, to discuss a proposal by the Air Force to amend existing military marking standards.

Present standard (MIL-STD-183), effective a little more than a year ago, requires the continuous marking of certain selected steels. The proposed revision (MIL-STD-183-A) covers identification markings of all iron and steel products ordered by the Defense department, but on a noncontinuous basis for the noncritical items.

Scope—The critical items for the Defense department, will continue to require continuous markings, but the noncritical, to be added under the proposal, need be marked only once. Where consistent with industrial practice, a heat number will be required in most cases, although it need be applied only once on each piece. This marking will be added to the producer's name or trademark and commercial designation. Shipment and acceptance markings are not within the scope of either of these standards.

Classes—The product classifications now covered include: Certain categories of bars; extruded shapes and shaped tubing; plates; sheet and strip (cut lengths only); and tubular products. Within these classes are about 75 selected item specifications. These same wide classifications also appear on the proposed noncritical list, where needs are not especially selected. To these are added structural shapes, castings, wire, forgings, ingots, slabs, billets and sheet and strip in coils.

Each spool of wire would be marked on the end and each coil or bundle of straightened or cut wire would be tagged. In forgings, the die or drawing number would be marked on each piece.

Bar Size — Under all defense coded marking, designated information would be printed, stamped or otherwise legibly marked on all bars ½-in. or more in width of flat and ½-in. or more in diameter, and, where continuous marking is required, in constantly recurring symbols at intervals not greater than 3 ft throughout the length of the bars. The same applies to extruded shapes and shaped tubing and tubular products. Where continuous marking appears in two or more rows, as, for instance, on critical plates, sheets and most sizes of strip, the printing in adjacent rows is alternately staggered.

Headaches — Code marking is creating many problems for the steel industry. Color coding has its limitations: There are few primary colors and no national standards for the wide variety of shades; colors and shades are subject to change with age; there is a surprising amount of color blindness, especially among men.

Continuous coding covers a wider range of purpose and leads to more complications. Motor-driven machines for such coding cost from $2500 to $10,000. Extra space is required for the operation and the handling of the steel to be marked, plus extra labor.

Incidentally, labor doesn't think too highly of the job, because volume of critical steels requiring this type of marking has been relatively light: Often men are switched to this work for only one day out of four, something they don't like, mill operators declare.

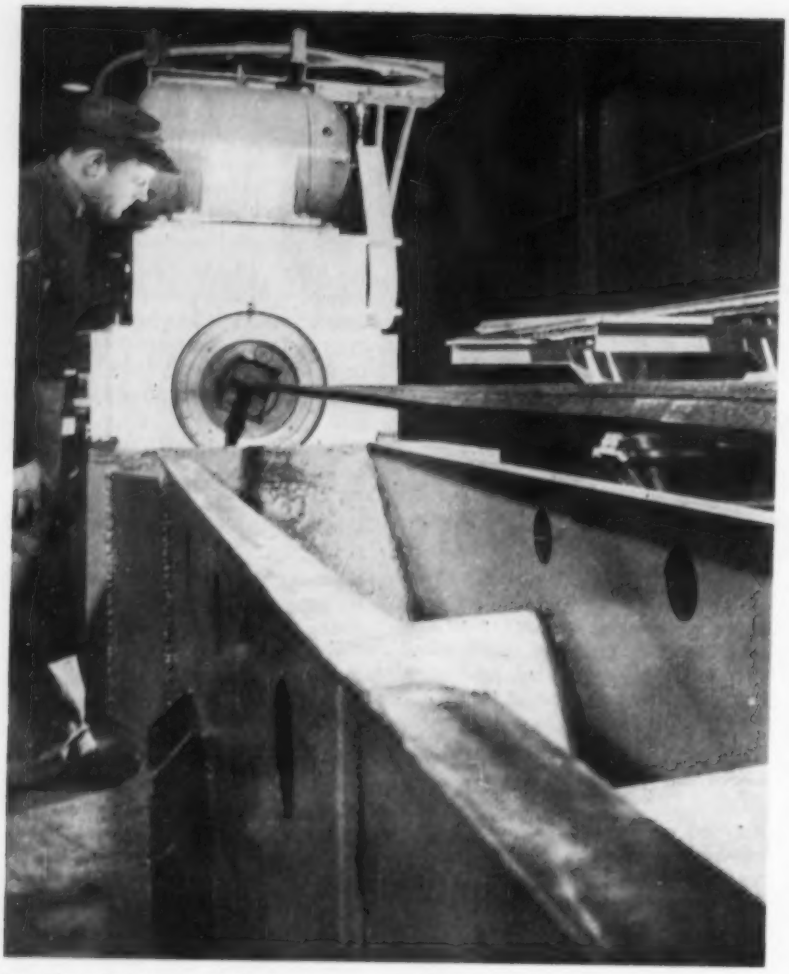
Coding extras are charged, but in general haven't proved satisfactory to either buyer or seller. Much of this dissatisfaction stems from the volume slated for continuous marking being too light to create a sound basis for arriving at proper extras.

Can't Be Done?—Some producers say that continuous code marking on the production line is a real headache, and virtually out of the question in most cases. Too much vibration, for one thing. Then there is the scale problem; and under some circumstances the necessity for degreasing and re-oiling. One producer of special cold finished sheets for the aircraft industry says his steel has to be rolled, cut to size, inspected and made ready to pack before it can be code marked. Producers of other steel products likewise insist that marking can't properly be done until inspection has been completed.

Needed — More work, it is said, must be done in the development of marking materials which will: 1. Dry rapidly upon application. 2. Not soften in oil. 3. Still be removable by some sort of solvent should remarking be necessary. At the same time, care must be taken that marking materials and methods do not have a deleterious effect on steel. Mechanically, methods must be developed for a faster change of marking devices.

Within these limits, color coding is working out well for certain identification purposes for jobbers and producers of steel specialities.

Refinements are constantly being made in the combinations of colors and the applications of various symbols to those combinations.



Stretcher-detwister straightens a steel extrusion at Jones & Laughlin, Pittsburgh

More Extrusion Equipment

NEW MARKETS are being created for presses, heating and other auxiliary equipment by the fast growth of the extrusion process.

So far, most of the action is in the nonferrous industries. It's likely to stay there for a few years. Though extrusion has a definite place in steel, there are just six processors today. Most have new equipment to digest before adding to capacity. By contrast, there are 105 nonintegrated producers of aluminum extrusions.

Nonferrous Picture—There were only a half-dozen aluminum extruders in 1945. Even by 1953, things were just starting to roll, with shipments of extruded shapes, tube blooms and tubing totaling 231,000 tons. By 1955, they had jumped to 413,000 tons, close to one third of total shipments of finished aluminum products.

Producers of other nonferrous metals have big plans for extrusion, too. Titanium, magnesium, nickel and brass fabricators are bolstering demand for the machinery. "Outlook is excellent for press sales to aluminum firms, but copper extrusion is growing as well," report officials of Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corp., New York.

Results—The resulting equipment market is attracting new bidders. Typical: The Furnace Division of Rust Engineering Co., Pittsburgh, will make extrusion heating equipment. "Sales outlook is very promising," says one executive.

Confirm sales heads of Loftus Engineering Corp., Pittsburgh: "Induction heating equipment markets are definitely expanding, due to increased interest from extruders of aluminum, brass, copper and nickel." And, even though equipment demand from steel extruders is relatively light, most pressmakers supply a variety of industries. Watson-Stillman Press Division, Farrel-Birmingham Co. Inc., Roselle, N. J., for instance, makes extrusion presses for aluminum, copper, steel and 14 other metals or materials.

What's Hot—Big improvements are being made in extrusion equipment. Magnathermic Co., Youngstown, points out that better temperature control is being built into furnaces to improve extrusions. Lake Erie Engineering Corp., Tonawanda, N. Y., says that increased demand for speed in both the extrusion and nonextrusion phases of the production cycle means more automatic, faster equipment.

Quality - consciousness among the fabricators, adds Loewy-Hydropress, means bigger sales of speed regulators, control devices, mechanized handling equipment and other accessories. Stretching machinery is one essential to good extrusion. Medart Division, Blaw-Knox Co., Pittsburgh, notes strong demand for stretchers from the nonferrous extruders as they improve their product.

Balance—Extrusion's place in nonferrous fabrication is assured. Last year, 28 per cent of all finished aluminum products were made by the process. In steel, it's still too early to gage full market potential. But, companies like Babcock & Wilcox Co., at Beaver Falls, Pa., are making big strides in adapting extrusion to American needs.

Today, extruded steel makes up less than 1 per cent of all steel shipments. But, says one producer: "All that's lacking before a big expansion is a few more years of operating experience."

Michigan Tool Prexy Anderson tells . . .

What Automation Demands

WHAT CHANGES will automation make in a plant's working force? What's the most economical way to build an automated line? What new tools will be needed to make automation practical?

For answers to these and other questions, STEEL went to Marvin R. Anderson, president of Michigan Tool Co., Detroit, a pioneer of automation in the machine tool industry.

Q: What's your idea of the automated workforce?

A: A new group of whiz-bang electricians will be needed to keep electronic feeder systems operating. A decentralized group of engineers must be created, trained to think in terms of automation, able to understand and solve problems ranging from machine design to feeder installations.

Automated machinery needs more service and maintenance. Many unskilled workers will be replaced by semiskilled. Material will need more inspection before it goes through the line, more final inspection on the line.

Q: Where will these skilled people come from?

A: Management will have to train former machinists to be specialists. Many of its men will come from unskilled and semiskilled ranks in the company. Instead of today's machine operator, we perhaps will see a new grade—mechanic supervisor. Different operating and pay standards will have to be evolved.

Q: Do you advocate putting in entirely new equipment when setting up an automated line?

A: Yes. Under any circumstances, planning and designing for automated production requires a terrific number of engineering hours. If you try to mix new equipment with old, engineering costs shoot way up. Also, newer machines have higher production rates and simplify material handling, because you use fewer machines to do the same job. In the long run, it's usually cheaper to start from scratch.

Q: What are some of the new equipment implications?

A: Improved safety equipment, like electronic and optical warning systems, will have to be built. More tape controls for repetitive cycling are another strong possibility. Perhaps punch card systems will come to the fore.

Tools will be standardized. Quick change arbors and chucks will be preset to make retooling quick and simple. Research on carbide and ceramic tool materials will be pushed.

Standardization also will be the answer to preventing lengthy line breakdowns. Companies will build up a stock of repair parts. One possibility—spare part banks could be spotted around the country or in large cities where there's a big demand.

Q: As far as the gear machinery industry is concerned, what can automation do today to boost production?

A: We're designing a spline gear line for an auto maker right now. It will turn out 280 gears an hour, double normal production rates for the item.

Two men will handle the whole line. One will load parts into the feeder system. The second will take finished gears from the end of the line. The system contains five tracer lathes. To reach the same production rate without automation would call for three additional machines and five more men.

Q: How about automatic checking and gaging?

A: They're all-important. They mean fewer rejects, closer tolerances and higher production. They also save man-hours. Eventual results will be higher standards. Non-automated companies which can't meet these standards will be at a serious competitive disadvantage.

Automation is here to stay. The increased output it permits eventually can compensate for higher wages for skilled workers. Its final result will be reduced costs.

WINDOWS OF WASHINGTON

Fourth-Quarter Boost Will Come from Reclamation?

THIS YEAR Washington has played Santa Claus to the construction industry. Already shoved into high gear by the gigantic federal road program, it will get another boost from a $174-million Bureau of Reclamation construction program. Metalworking will benefit from construction equipment sales and other material: One heavy electrical generator, about 85,500 kw of capacity, will be installed this year. Most of the work is in the western states.

SEC's Rule To Aid Nuclear Research

Companies engaged in the development of nuclear power can breathe easier about their chances of being classed as electrical utilities and brought under the holding company act. Several nonutility companies had threatened to withdraw from co-operative ventures sponsoring nuclear power research, because of that possibility. A new Securities & Exchange Commission policy exempts them so long as their connection with electrical energy is: Ownership or operation of facilities for production of heat or steam from special nuclear material on a nonprofit basis.

Sheet Steel to Moscow: Wha' Hoppen'?

Some congressmen are mulling over the value of investigating the export of some 7800 net tons of sheet steel to Russia. The deal, the first export of sheet to the Soviet since '47, was O.K.'d by the government after it was determined sheet isn't in short supply here and not on the strategic material list. Supposedly, the steel will go to a Soviet auto plant. The name of the shipper comes under the Commerce department's definition of confidential information. Spokesmen would not comment on whether more such shipments are pending; if they are, it is "assumed" they will be approved.

Grand Canyon Disaster Pushes Program

Watch for an attempt to compress the five-year federal airway program into three years. The $246-million plan is aimed at increasing air safety. The Grand Canyon disaster has put the program in the public eye. If the move materializes, the pressure will be on electronic firms, because the heart of the improvement program is long-range radar and other electronic control devices.

Complaint Dropped by FTC

A complaint charging Yale & Towne Mfg. Co. with unlawful price discrimination in the sale of material handling equipment has been dismissed for lack of evidence by the Federal Trade Commission. The commission found that "competition in this industry is active, keen, healthy and increasing."

Executive Reserve Recruits

The National Defense Executive Reserve has its first group of recruits. Commerce Secretary Sinclair Weeks has named 83 industrial executives who will be available immediately to the Business & Defense Services Administration in case of emergency. Another 223 men are being cleared for security. All of the recruits formerly served with the National Production Authority or as BDSA WOCs.

Meet Loring Roach: The newly appointed director of Business & Defense Services Administration's General Components Division will serve for about six months. His regular post is at Standard Pressed Steel Co., Jenkintown, Pa., where he's chief development engineer. Mr. Roach is a graduate of the Naval Academy and has been with Standard Pressed Steel since 1950.

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ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
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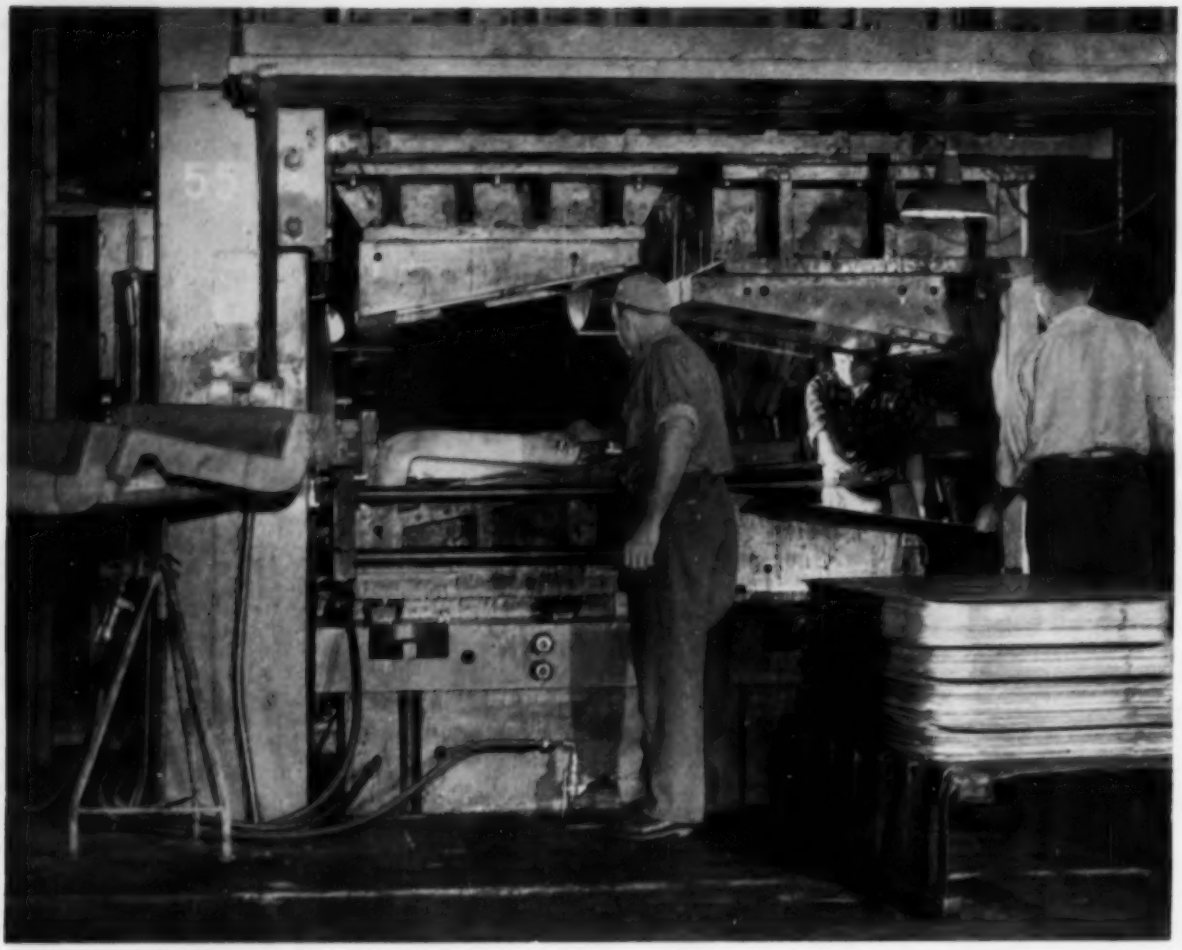

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And just as important, they have the uniformity of quality that enables you to run even the most difficult part hour after hour without jam-ups and with a minimum of rejects.

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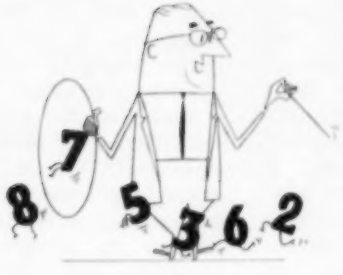


Einar Borch Makes Statistics Work

"THE BREAK-EVEN chart is our bible; if ever a small company operated by break-even chart principles, ours is one." Einar A. Borch, vice president and general manager of National Metal Abrasive Co., Cleveland, continues: "By using our break-even charts we sailed right through the 1954 dip without any trouble. We saw it coming and knew just what we had to do to meet whatever happened."

Figures and Trends—Each year Mr. Borch analyzes a maze of statistics for the Foundry Equipment Manufacturers' Association. He's chairman of its statistical committee and also a member of the board of directors.

Before making his report to the association, Mr. Borch spends about three weeks studying and checking figures and trends. He says: "After I'm finished, I also have a pretty good idea of what to expect for our company during the coming year."

Mr. Borch has a questioning attitude on the use of statistics. He asks: "Are the facts used to form an idea or are they used to bolster one already conceived?"

Small Business—Mr. Borch enjoys the challenge inherent in small business. He's been with National Metal Abrasive since 1933. It has 40 employees, and Western Metal Abrasives Co., Chicago Heights, Ill., where he is also vice president and general manager, has about 30 workers.

Mr. Borch suggests two tools to get big company thinking into a small business: 1. Trade associations and societies. 2. Business publications. "Solving problems isn't hard," he says. "The job is to recognize when a problem exists."

The big difficulty in a small company, Mr. Borch believes, is the tendency to lose sight of small problems when tackling a big project. To make sure no problem is neglected, he sets up a check list that is reviewed once a month.

A Goal—In business, it is necessary to have a goal. To have a meaningful goal for sales, Mr. Borch says it is necessary to know the market. He believes in a studied approach to market analysis. His company moved to a higher quality, premium price product after making a market study and found that improving the product improves the whole plant.

Mr. Borch is a great believer in sales reports. Good sales reports, he says, can be the turning point in business. He looks to sales reports to keep informed of what competitors are doing and changes in the trend of business.

Industrial Parks Cut Costs

The boom in these developments is just starting to roll. Advantages: Lower production costs with modern facilities; improved employee morale; better shipping facilities

STORMS a company president: "I can get property for $2000 an acre to build our new plant. How can these people submit a proposal for $8000 an acre?"

The $8000-an-acre land is part of an industrial park site. Why the higher price? Water, gas, electric and sewer facilities are installed. And centralized planning and financing are available.

What Is It?—Starting with the Army depots which were converted into industrial warehouses and distribution centers after World War II, industrial parks have grown into attractively landscaped tracts which are helping metalworking companies reduce production costs.

Some 155 industrial parks operate throughout the U.S.

Straight Line Flow—Says one occupant of a new park: "We had three plants in a crowded city. We now are just 14 miles from the heart of the same city, but have been able to increase production with two-thirds as much floor space in a one-story building as we had in our old multistory plants. The answer to our production headaches has been straight line flow."

Other advantages: Supervision is simplified. Deliveries by rail and truck have speeded up. Employees relax during lunch hour (play ball, get sun tans, tinker with their cars, etc.). Workers tend to move out of the congested city and rent or buy homes near the plant.

How To Start—Elmer F. Hansen, president, Ft. Washington Industrial Park, Pa., reports: "We started to develop our present location almost five years ago. It took between three and four years just to get the land zoned industrial."

After zoning, most industrial developers (realtors, railroads, banks, investment groups) set up ground rules. Some of them: Fronts of buildings must be set back from 50 to 200 ft. Buildings must be of brick exterior. Off-street parking, to the rear of building fronts, must be provided. Building plans, if not done by the park's architects, must be approved by the architectural committee. Each company is responsible for the landscaping of its site.

Restriction on the amount of smoke and noise permitted has a tendency to lure light industries (stampers, electronic manufacturers, toy makers, fabricators, etc.), warehouse-type businesses and branch sales office operations.

Advantages—A company going out to buy a piece of land on its own must conduct an analytical study, reports Cabot, Cabot & Forbes Inc., Boston. It must compile information and come up with the right answers to questions on: 1. Zoning. 2. Topography (includes subsoil conditions). 3. Utilities. 4. Truck, railroad and railway express service and rates. 5. Public transportation. 6. Postal service. 7. Title flaws, assessment policy and tax structure. 8. Political climate.

Firms such as Cabot, Cabot & Forbes can do the preliminaries for you. They find it more economical to do it on a mass scale through an industrial park. They are integrated groups and can furnish the necessary equity money and financing, engineering, design and architectural assistance necessary when starting from scratch on a new plant. These organizations have their own associated contractors and real estate men to conduct negotiations, too.

Conveniences—The Ft. Washington Industrial Park plans to have a central-type executive club, supervise the building of a public auditorium for the use of all the companies and set up a dispensary and central guard system for the entire park. Says Mr. Hansen: "No one will be made to support or participate in these functions unless he wants to, but we have no doubt that it will save all our clients money by having the park develop these added conveniences."

Most industrial parks are seeing that there is a bank, post office, restaurant, service station and motel on or adjacent to the park site. Some park developers are buying up property near the parks for new housing projects. A tribute to the attractiveness of the industrial center is that many homes valued from $20-000 to $30,000 are being built within a mile or two of land which is zoned industrial. Reports one home builder: "Prospects say that the industrial parks in this state look like college grounds."

Transportation—Superhighways

Typical industrial park planning: Ft. Washington Industrial Park, Pa.

Park Developers Provide:

Before the sale

SURVEYS

Zoning, labor, traffic analysis, market analysis, water, transportation, housing, schools

GROUND PREPARATION

Streets, utilities, grading, test borings, sewerage

After the sale

Complete architectural service
Centralized material purchasing
Construction supervision

After you have moved in

SERVICES

Maintenance on zoning, ground, plant, street, recreation, water supply, sewerage
Plant protection
Centralized dispensary
Community relations

are another key to the success of industrial parks. The Syracuse Industrial Park has the $1 billion New York State Thruway on its northern boundary. Most parks under construction are on new superhighways or will have four-lane roads running near the tracts in the near future.

Railroads have been leading backers of industrial park developments. The New York Central Railroad provides detailed brochures on land it owns. Its Chicago Crawford Development has some 380 acres with paved streets, curbs, gutters, water, sewer and street lighting systems, along with electric power and gas facilities. The railroads are not interested in making a profit on the land. Their aim: To bring in manufacturers who will use the maximum number of freight cars.

Trends—The Toledo Expressway Industrial Park has "ever-available" buildings. The basic unit has 18,000 sq ft but can be expanded to 50,000 sq ft. Say backers of this plan: "You simply move and adapt the structure to your own operations with minimum delay and trouble." The Toledo park has the more conventional plan of providing architectural and constructional services, too.

Some park managements are offering engineering service in smoke and noise abatement to help desirable manufacturers qualify for plant sites. Financing: Detroit, Toledo & Ironton Railroad is sponsoring the Ford Park at Lima, O., and reports that sites or facilities may be purchased outright, leased for long term or with an option to buy, or be purchased on installments.

New Life—New England is singing the praises of the industrial park. The New England Council reports that a state by state survey shows: Maine has 6 parks operating, 1 planned; New Hampshire has 6 parks in various development stages; Vermont, 4; Massachusetts, 11; Rhode Island, 5; Connecticut, 9.

Says one industrial realtor: "Planned parks may have as few as 30 companies or as many as 1000 on one tract of land. We are limited only by our own imagination and initiative."

Cross Co. Opens School

A way around the engineering shortage has been organized by Cross Co., Detroit. It has started an engineering school to train machine designers for its expanding automation machinery and special machine tool building operations.

Students enter upon a concentrated learning program for 26 weeks and then are transferred to productive work in the company's engineering department.

Ralph E. Cross, executive vice president, points out that the program is not a substitute for an engineering degree. "The schooling is designed to fill our needs in the future," he states, "and all trainees will be urged to complete their formal engineering schooling."

Training sessions will familiarize students with standard and special machine tools, engineering fundamentals and drafting techniques.

ODM Lists Tax Write-Offs

Certificates of necessity for fast tax amortization for 60 projects totaling over $116 million were issued by the Office of Defense Mobilization in the two-week period ended June 27.

The largest project is that of American Liberty Steamship Corp., Washington. It plans to spend $32.1-million for roll-on, roll-off ocean-going vessels.

The Southern Railway received a certificate for fast tax write-off on a $15-million railroad freight classification yard in Atlanta.

Certificates for $14,305,000 of aviation alkylate facilities at Bellingham, Wash., were issued to New England Industries Inc.

Armco Steel Corp., received a fast tax write-off for a $13,740,000 grain-oriented steel sheet project at Butler, Pa.

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

WELL-MADE, VERSATILE OUTER RACES

Outer races are vital parts of all roller bearings, except where housings can provide hardened and ground operating surfaces. In housings of aluminum, cast iron or un-heat-treated steel, outer races assure a dependable roller pathway.

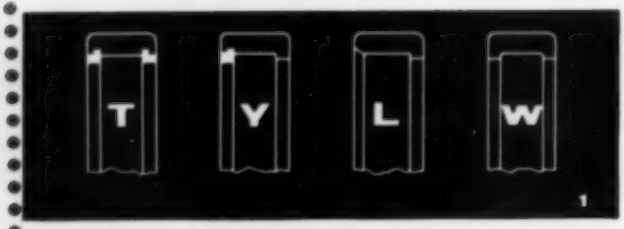
While the outer race is not normally the critical member of the bearing, it can still suffer fatigue failure, like all objects subjecte l to stress repetitions. Therefore HYATT outer races are manufactured with the same scrupulous care that we apply to inner races and all other components of HYATT Bearings. We supply a wide variety of outer races, which makes HYATTS versatile enough to fit practically any design requirements. Some of these application and operating advantages are briefly covered at the right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your needs. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

GM GENERAL MOTORS

HYATT

ROLLER BEARINGS

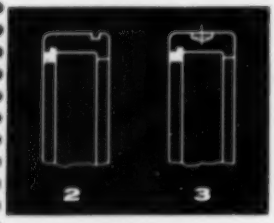


1. OUTER RACE TYPES

HYATT Hy-Load outer races are available in a variety of standard configurations (Figure 1). W, L and Y races have solid flanges, which sustain light or intermittent thrust loads. T and Y races with internal snap rings have equal radial load-carrying capacity but are not recommended for applications under continuous thrust. T, Y, L and W races may all be mounted using roller ends against the solid shoulder or internal snap ring for purposes of locating the outer race axially.

2. CIRCUMFERENTIAL LOCATION

An ample choice of outer race locating methods may be used with HYATT Hy-Loads. Circumferential location is often by a press fit. (Generally the rotating race should be applied with a press fit and the stationary race with a push fit.) When a push fit is used, axial clamping against the race ends provides satisfactory circumferential location. Positive circumferential location is provided by an outer race dowel.



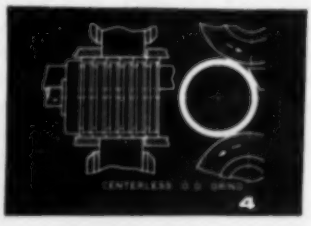
3. AXIAL LOCATION

Axial location of an outer race is usually by pressing or pushing the race to a housing shoulder. The race may be prevented from "walking out" of the housing bore by the flange or snap ring operating against the roller ends. Axial clamping against a housing shoulder or snap ring provides positive axial location. However, if a shoulder is not available in the housing, an auxiliary holding device such as an external snap ring or an outer race dowel is needed. HYATT Hy-Load Bearings can be supplied to original equipment builders with outer races having a snap ring groove (Figure 2) or a blind dowel hole (Figure 3), at moderate increase in cost.

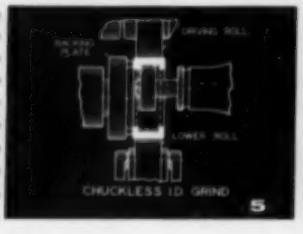
4. OPERATIONAL REQUIREMENTS

Quality controls are rigidly applied to all HYATT outer races to maintain: a. Minimum wall variation; b. minimum runout of race ends to bore; c. minimum runout of race flange inner faces to bore; d. minimum pathway and outer diameter taper; e. minimum outer diameter tolerance.

5. MANUFACTURING PROCEDURES



After careful primary machining and heat treating, ends are faced off square and parallel by a double end grind. This provides a reference surface from which all runouts and squareness can be gaged. Outer race diameters are generated by the centerless grinding method to provide an O.D. with as little out-of-round as practical. The through-feed method is a valuable economy (Figure 4). Next, the pathway (or race I.D.) is ground centerless, generating a cylinder concentric with the O.D. cylinder, by driving the race on the O.D. and positioning the grinding wheel relative to the drive roll (Figure 5). Finally, flanges are ground using the race ends as a reference. The result is a race of as nearly perfect geometry as is practical (Figure 6). Critical final inspection completes the procedures.



This paint line's being revamped, other changes coming . . .

Behind the Scenes at Willys

WILLYS MOTORS INC., Toledo, O., is consolidating its body paint lines, parts and accessories division and is remodeling one of its final assembly lines.

The changes will result in higher quality paint jobs, more manufacturing space, increased efficiency and savings up to $140,000 annually, according to H. E. Kelley, chief manufacturing engineer.

Paint Line—"Jeeps currently are painted in one building while trucks, station wagons and other vehicles go through a separate line in another building," explains T. F. Ellis, chief plant engineer.

Both of these lines will be consolidated into one area by September. Several problems have had to be worked out before the changes could be started.

Hung Up — Jeep bodies run through the whole painting process hanging vertically from an overhead monorail conveyor. On the truck and station wagon line, bodies are carried on dolly trucks. "We're going to scrap the monorail line and adapt some of the dollies to handle Jeep bodies," reports Mr. Ellis.

Two oval lines are being laid out next to each other. The inner line will handle Jeeps and one-color bodies. The outer line is being rearranged for two-tone paint jobs.

Two-Tone — After bodies are sprayed with two coats of one color, they are routed through a separate masking and paint repair area before being led back into line. On the next go-around they get two coats of a second color.

Savings—Cost of the consolidation is about $15,000, but Willys figures putting the two lines side by side will save $20,000 annually on maintenance costs.

Claims Mr. Ellis: "Our biggest improvement will be the better paint jobs we'll get on two-tone bodies. Up to now, two tones got one heavy wet coat of each color. With a separate line, we can spray on two full bake coats of each color."

Accessories—Another consolidation, scheduled for late fall completion, is moving all Willys and Kaiser parts and accessories into one building. Each stock group formerly was housed in a separate area. The change will cost about $125,000, but will save the company some $120,000 a year in

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bookkeeping and personnel charges.

Mr. Kelley says almost 400,000 sq-ft of space will be made available by the changeover.

Mule — Approximately one fourth of the area will be devoted to manufacturing the Army's mechanical Mule. Willys has just received a $3.5 million Army Ordnance contract to make the four-cylinder vehicle.

The Mule is a mobile platform carrier about 8 x 4-ft in size. Only 27-in. high, it's designed as a cargo carrier and recoilless rifle mount. First deliveries are scheduled within a year. Willys says it will start tooling at once.

Assembly—Perhaps the most interesting changes being made at the Toledo plant are in one of Willys' two final assembly lines and in the body assembly area.

One line is being slightly changed; modifications are being made in the carriers. A multiple spot welder is going into the body assembly area. Willys also is adding jigs, fixtures and portable spot welders from its old passenger car operations.

Rumor—Although the company has no official comment, it's rumored that another four-wheel drive vehicle will be added to the Willys line.

Judging from assembly line changes, it seems likely the new job will be a truck type body. Probable introduction date could be this fall in keeping with the industry's new model announcements.

More Plants Going Up

Ford Motor Co., Dearborn, Mich., will build a 1.5 million sq-ft assembly plant near Lorain, O. It's scheduled for 1958 completion.

R. S. McNamara, Ford division general manager and company vice president, says the plant will contain separate production systems for cars and trucks. Daily capacity is expected to be 960 units. Employment will run in the neighborhood of 2500 for one shift; 4500 for two-shift operation.

The company has built two engine plants, a foundry, parts depot and a stamping plant in the greater Cleveland area since 1950.

One factor Ford and other automakers are considering as they move into this section is the advent of the St. Lawrence Seaway. Lorain is expected to become a major port city when the Seaway is opened.

Meanwhile, Motor Wheel Corp., Lansing, Mich., has announced it's building a $3.5-million plant near Newark, Del. The 100,000 sq-ft facility will be used for making auto wheels, hubs and brake drums.

The Newark facility is on the main line of the Pennsylvania Railroad. It initially will employ about 100 persons. Production is scheduled to start in the spring of 1957.

Chevvy Leads Output Race

Chevrolet has a better than five-point percentage lead over Ford at the halfway mark in this year's production race. Buick is a cinch for third and Plymouth may have to fight to keep Oldsmobile out of fourth position.

Ward's Automotive Reports furnishes figures which show Chevvy taking 27.5 per cent of total production while Ford claims 21.9 per cent. At this time last year there was less than two percentage points difference between the makes (Ford 21.02; Chevvy 22.05).

The race is far from over, however, and Ford will put on a strong bid to recapture the lead, using '57 models as a sales whip. Next year's Fords are reputed to have major styling and engineering changes, while Chevvy supposedly is holding back on the big switch until 1958.

Look for Buick to come in third for the year. First-half output stands at 10.1 per cent compared with 9.9 in '55. Plymouth, on the other hand, has dropped from 9.9 last year to 7.6 this year. That puts it behind Oldsmobile which is taking 7.9 per cent of total production.

A midyear prediction sees Plymouth dropping to fifth spot in the annual output race. But increased price tags on the Olds and flashy styling on '57 Plymouths might make it such a good sales bet that last-quarter production will shove the Chrysler entry into fourth place.

If Chevvy, Buick and Olds do take three out of the four top spots, there will be almost as much outward gloom in the GM camp as in Chrysler quarters. The corporation already is drawing fire from governmental and industrial circles for hogging the market. Continued sales and production winners will serve to make the flame a little hotter.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,141†	649,393
6 Mo. Total	3,192,349†	4,257,154
July		659,763
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
June 16	100,804	139,743
June 23	105,243	151,249
June 30	103,037	158,402
July 7	68,110	134,092
July 14	112,424†	167,473
July 21	110,000*	196,434

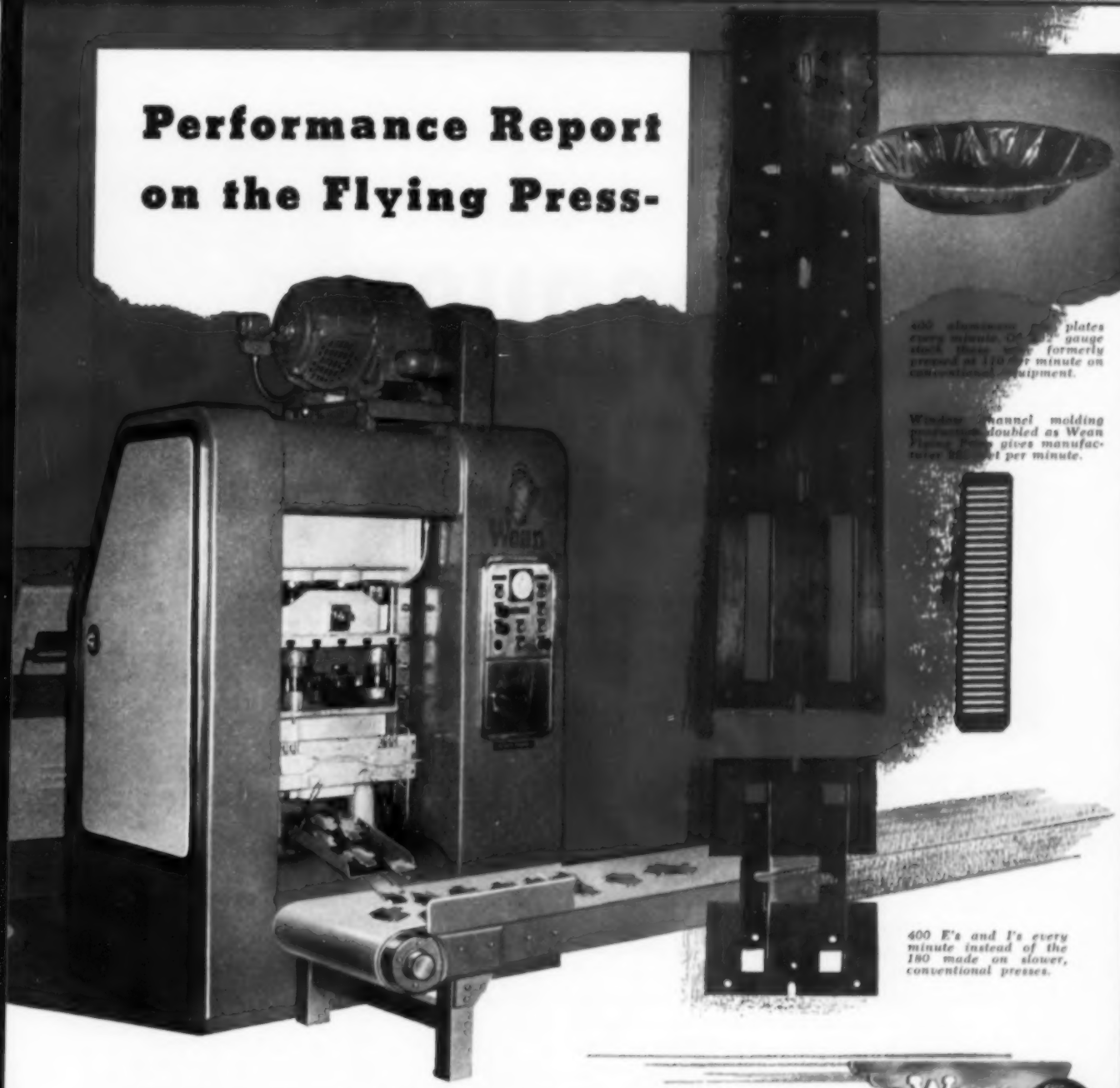
Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Exhaust Notes

•Automatic electronic gear checkers are being used to test transmission gears in some automotive plants, according to Michigan Tool Co., Detroit, which makes the equipment.

•Ford and Mercury have scrapped plans for unit body construction for some time to come, according to sources. Lincoln, however, is rumored to have it in the works for 1958. GM divisions apparently are sticking to frame and body construction although the '57 Buick frame will be wider, making for a slight step down similar to AMC's Hudson. Chrysler is keeping quiet. It's said the Imperial and Windsor models may spring a semi unit frame on the market this year or next.

Performance Report on the Flying Press-



400 E's and I's every minute instead of the 180 made on slower, conventional presses.

Window channel molding ... doubled as Wean ... gives manufac- ... per minute.

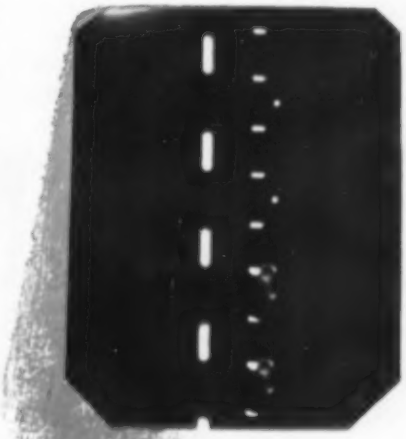
Revolutionary Wean Press continues to amaze the industry

Since it was first introduced to industry, the Wean Flying Press has commanded the interest of imaginative production people.

On paper, it looked good. Tests on the hand made prototype were even more convincing. But, could a production model achieve such levels under actual operating conditions?

For the answer—note the typical production figures set down here. In every case, the Wean Flying Press, using standard die sets, has established a performance record.

Why not acquaint yourself with this amazing press now? Contact the Wean Sales-Engineer in your area or write direct.



Shallow draw and punch work on .065 gauge stock boosted to 400 pieces per minute by Wean Flying Press.

Wean

EQUIPMENT CORPORATION

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9035

INTRODUCING GRAPH-AIR...

a tougher, more versatile graphitic tool steel that air-hardens at temperatures 200° to 300° lower with less distortion!

NO facilities for oil-quenching—or other relatively costly heat treating processes? Need a finer air-hardening tool steel? Then specify *Graph-Air,* newest steel resulting from the Timken Company's pioneering in fine alloy steels. Latest addition to our line of quality graphitic tool steels!

Graph-Air tool steel air-hardens at temperatures of 1450°F to 1550°F—200° to 300° lower than most other air-hardening tool steels. And because Graph-Air *is* air-hardened, there's less distortion, easier heat treating control, less decarburizing. As a result, Graph-Air can be made into *more intricate sections.* Graph-Air is a tough air-hardening steel, too—made to order for such demanding applications as blanking dies, or any tool steel part which must take hard abuse.

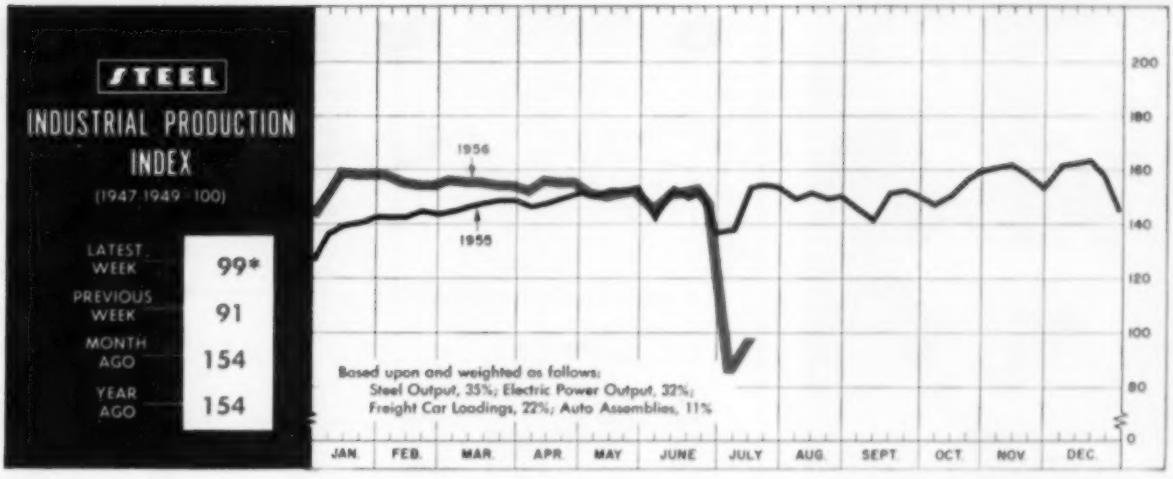
Besides all the advantages of air-hardening—economy, less drastic reactions to quenching, less tendency to scale—Graph-Air offers greater wear, machinability and stability. Like Graph-Mo, Graph-Air will outwear other tool steels, because of the uniform diamond-hard carbides in its structure. And Graph-Air machines 30% faster. The free graphite in its structure acts as a built-in lubricant. And Graph-Air stays *accurate longer,* is fully as stable as other Timken Company graphitic tool steels, which are the most stable tool steels made!

Growing out of the Timken Company metallurgists' long experience with fine steel making, Graph-Air—the *new* graphitic tool steel that can be air-hardened at *low* temperatures—will be available in both solid and hollow bar sizes. For more information, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended July 14

Steel Strike Assures Inventory Slash

INVENTORIES, long the scapegoat of business pessimists, are heading for the spectacular downward adjustment which accompanies a major strike in an industry as basic as steel. Add the impetus of a stock-reduction program in the automotive industry, and the adjustment becomes even more pronounced.

Manufacturers' inventories of all goods have followed a rising trend since May, 1955, on a seasonally adjusted basis. Latest figures from the Office of Business Economics place the value at $48.6 billion in May, a record that undoubtedly was broken in June. Much is made of the fact that price rises have swelled the figure. But the fact remains that prior to July 1, manufacturers were in pretty good shape on raw materials.

Farsighted? — This was especially true for durable goods manufacturers, who purposely laid in between 18 million and 20 million tons of steel products. Not all of this was a hedge against a steel strike, because at the same time increasing orders and sales required a higher ratio of raw materials.

Just how far the adjustment will go depends on how long the steel mills are shut down, but already steel consumers have been living off inventories—both in plant and in transit—for more than three weeks. They will continue to do so—to some extent, at least—for several weeks after the strike settlement because of the time required to get the furnaces back in operation. After the one-day strike last year, the industry did not get back to prestrike levels for another four months.

A long strike—six weeks or more—could also result in the virtual liquidation of dealers' stocks of new automobiles. While the auto industry has perhaps the best supply of raw materials among major metalworking industries, it is probably no more than necessary to complete the 1956 model run. If the steel mills are still

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	360	317	2,195
Electric Power Distributed (million kw-hr)	10,500[1]	10,391	10,440
Bituminous Coal Output (1000 tons)	1,235[1]	7,070	7,358
Petroleum Production (daily avg—1000 bbl)	7,050[1]	7,086	6,626
Construction Volume (*ENR*—millions)	$657.4	$389.8	$578.4
Auto, Truck Output, U. S., Canada (*Ward's*)	145,169[1]	89,236	207,627
TRADE			
Freight Car Loadings (1000 cars)	525[1]	478	799
Business Failures (Dun & Bradstreet)	208	249	204
Currency in Circulation (millions)[3]	$30,923	$30,763	$30,416
Dept. Store Sales (changes from year ago)[3]	+3%	+7%	+13%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,656	$20,226	$19,658
Federal Gross Debt (billions)	$273.0	$272.7	$274.3
Bond Volume, NYSE (millions)	$16.6	$12.3	$20.4
Stocks Sales, NYSE (thousands of shares)	11,359	7,874	11,607
Loans and Investments (billions)[4]	$85.5	$85.6	$84.1
U. S. Govt. Obligations Held (billions)[4]	$26.6	$26.6	$31.8
PRICES			
STEEL's Finished Steel Price Index[5]	210.45	210.45	207.63
STEEL's Nonferrous Metal Price Index[6]	259.4	275.7	239.4
All Commodities[7]	114.1	113.9	110.2
Commodities Other Than Farm & Foods[7]	121.4	121.4	114.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

IT PAYS to take a close look at the quality of the tubing you are using. Usually, it has as much to do with your machining and assembly costs as it does with the performance of your products. TMI tubing has proved its worth on the drawing board, on the assembly line . . . and on the profit reports of hundreds of America's fastest growing Companies.

WHEN YOU invest in the best precision workmanship, guaranteed by the dependable TMI "Mark of Quality," you follow in their footsteps. Don't take tubing quality for granted—take a closer look at your *real* tubing costs . . .

STAINLESS STEEL AND SPECIAL ALLOY TUBING

—in small diameters, .050" to .625" O.D. with tolerances as close as .001" when required.

"We are never too busy to help you solve your tubing problems the precision way."

TUBE METHODS INC.

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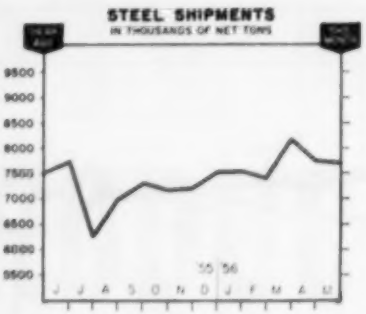
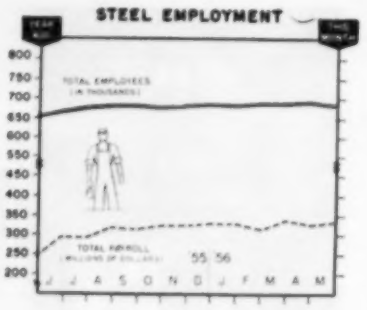
BRIDGEPORT (Montgomery County), PA.

THE BUSINESS TREND





	Net Tons		
	1956	1955	1954
Jan.	7,587,870	6,009,958	5,727,600
Feb.	7,468,393	6,119,900	5,364,978
Mar.	8,255,834	7,268,795	5,583,690
Apr.	7,783,873	7,279,321	5,287,972
May	7,764,776	7,540,889	5,423,168
June		7,770,213	5,887,488
July		6,250,597	4,490,179
Aug.		7,053,615	4,681,242
Sept.		7,378,247	5,004,222
Oct.		7,216,521	5,035,364
Nov.		7,247,994	5,240,209
Dec.		7,580,943	5,448,649

American Iron & Steel Institute

Charts copyrighted, 1956, STEEL

	Employment in Thousands		Payroll in Millions	
	1956	1955	1956	1955
Jan.	681	605	$329.1	$258.8
Feb.	684	616	317.3	255.1
Mar.	685	630	338.1	288.2
Apr.	688	643	326.7	282.0
May	680	654	333.6	249.1
June		667		298.4
July		676		296.8
Aug.		680		320.7
Sept.		680		317.1
Oct.		678		325.1
Nov.		680		326.1
Dec.		682		330.6

American Iron & Steel Institute

down when changeover period comes in Detroit, new model introduction will be delayed and some salesrooms will see vacant floor space. Even now, *Ward's Automotive Reports* hints about a possible new car shortage for September-October.

Not Alone — But steel users aren't the only ones eating into inventories. In the copper industry, for some time fabricators have been cutting down on stocks. Even the recent drop in price of the primary metal—to 40 cents a pound—hasn't resulted in any rush to the market place. While users were shouting about shortages, it seems they were also laying away a nest egg. There is some evidence of the same thing in the aluminum industry—users laying away the light metal in anticipation of higher prices.

The drop in physical volume of inventories will be offset somewhat by higher prices later in the summer. All steel users will eventually mark up the price tag on stocks, as will some nonferrous consumers. But the over-all picture will show a better balance between sales, inventories and new orders than has prevailed for over a year.

Durable Goods Lead Way

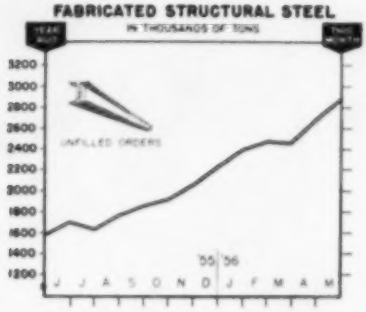
Inventory liquidation will come at all levels of business. Retail sales in June were climbing fast, and early reports show that July started out at the same rate. Even with the normal supply channels in full operation, inventories of durable goods at the wholesale level managed to stay on only an even keel at $6.5 billion from March through May. With even moderately heavy demand in July —and it must be remembered that more persons are working now than ever before despite the steel strike—retailer demand is bound to reduce the wholesalers' stocks, which will in turn bring a reduction in manufacturers' stocks.

Record Fourth Quarter

What about the fourth quarter? It'll be the best three-month period of 1956, which means the best quarter on record. It will be limited only by the amount of steel the industry can turn out. Some spending plans of both corporations and individuals will be canceled or postponed during the strike, because of lack of materials, money or both. But enough

FABRICATED STRUCTURAL STEEL

IN THOUSANDS OF TONS

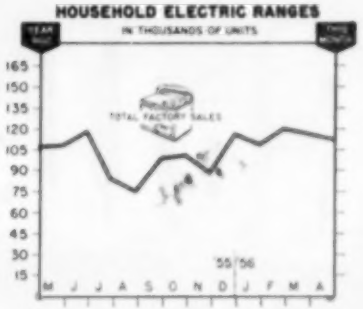


	Shipments 1956	Shipments 1955	Backlogs 1956	Backlogs 1955
Jan.	251.5	225.8	2,408	1,346
Feb.	285.4	213.4	2,476	1,360
Mar.	306.8	227.8	2,463	1,392
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,592
June	....	282.3	....	1,706
July	....	219.4	....	1,639
Aug.	....	268.0	....	1,776
Sept.	....	289.1	....	1,854
Oct.	....	283.8	....	1,928
Nov.	....	258.9	....	2,075
Dec.	....	248.0	....	2,243
Total	....	2,979.4		

American Institute of Steel Construction

HOUSEHOLD ELECTRIC RANGES

IN THOUSANDS OF UNITS



	Total Factory Sales—Units 1956	1955	1954
Jan.	110,140	138,663	101,870
Feb.	122,514	127,188	109,647
Mar.	117,544	130,180	115,393
Apr.	114,619	108,619	92,751
May	85,977	109,263	82,649
June	....	105,088	85,854
July	....	85,629	80,017
Aug.	....	76,158	75,907
Sept.	....	101,709	99,611
Oct.	....	103,610	84,321
Nov.	....	88,290	79,349
Dec.	....	118,161	85,033
Total	....	1,289,949	1,092,393

National Electrical Mfrs. Assn.

will carry over so that, added to normal demand, the fourth quarter will be a real humdinger.

Index Still Dynamic

STEEL's industrial production index shows that there is still a lot of bounce left in the economy. After dipping to 91 per cent of the 1947-1949 base period (this was accentuated by the July 4 holiday), it rebounded 8 percentage points to a preliminary 99 for the week ended July 14. Of the 55-point drop from the last "normal" prestrike week (ended June 23), steel operations account for about 43 points. Freight car loadings account for another 8 points because of the coal miners' annual vacation. Auto production helped erase some of the deficit with a strong 133,331 units for the week ended July 14.

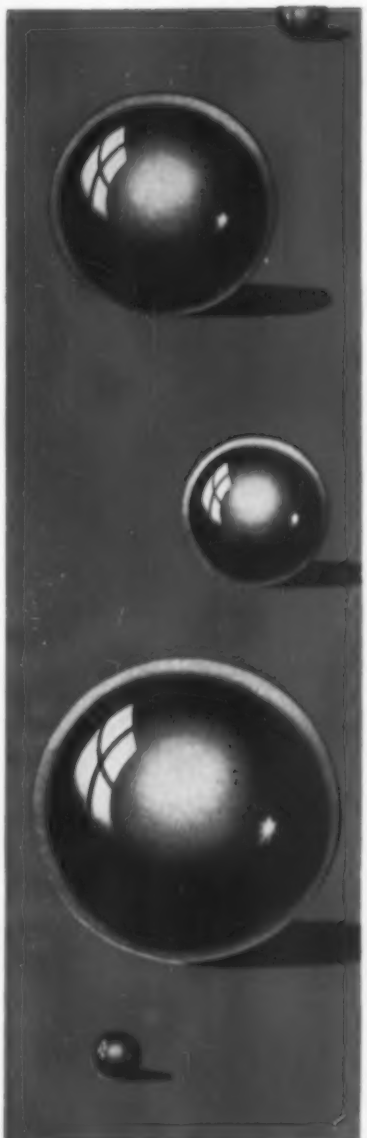
Strike Halts Records

Shipments of steel products and fabricated structural steel and employment and earnings in the steel industry were running at near-record levels in May, the last month unaffected by the strike (see charts on pages 56 and 57). Figures for all of these will show a dip in June because of the prestrike shutdown. July will be a complete blank for all but structural steel shipments unless the strike is settled soon. Once it is ended, employment will build to record levels in fourth quarter, with the payroll reaching a new high somewhat sooner because of the wage increase. Shipments of fabricated structural steel will fall short of the previous record during the balance of this year.

The heavy demands for other, more profitable products will push structurals and plate into the background until the steel industry gets back on its feet.

Market Memos

• Construction put in place in June rose seasonally to $3.993 billion, $57 million above last year's June record, according to the Commerce and Labor departments. F. W. Dodge Corp. reports that awards for future construction in 37 eastern states in June fell 3 per cent below the year-ago period. However, the first six months set a record of $13,198,959,000.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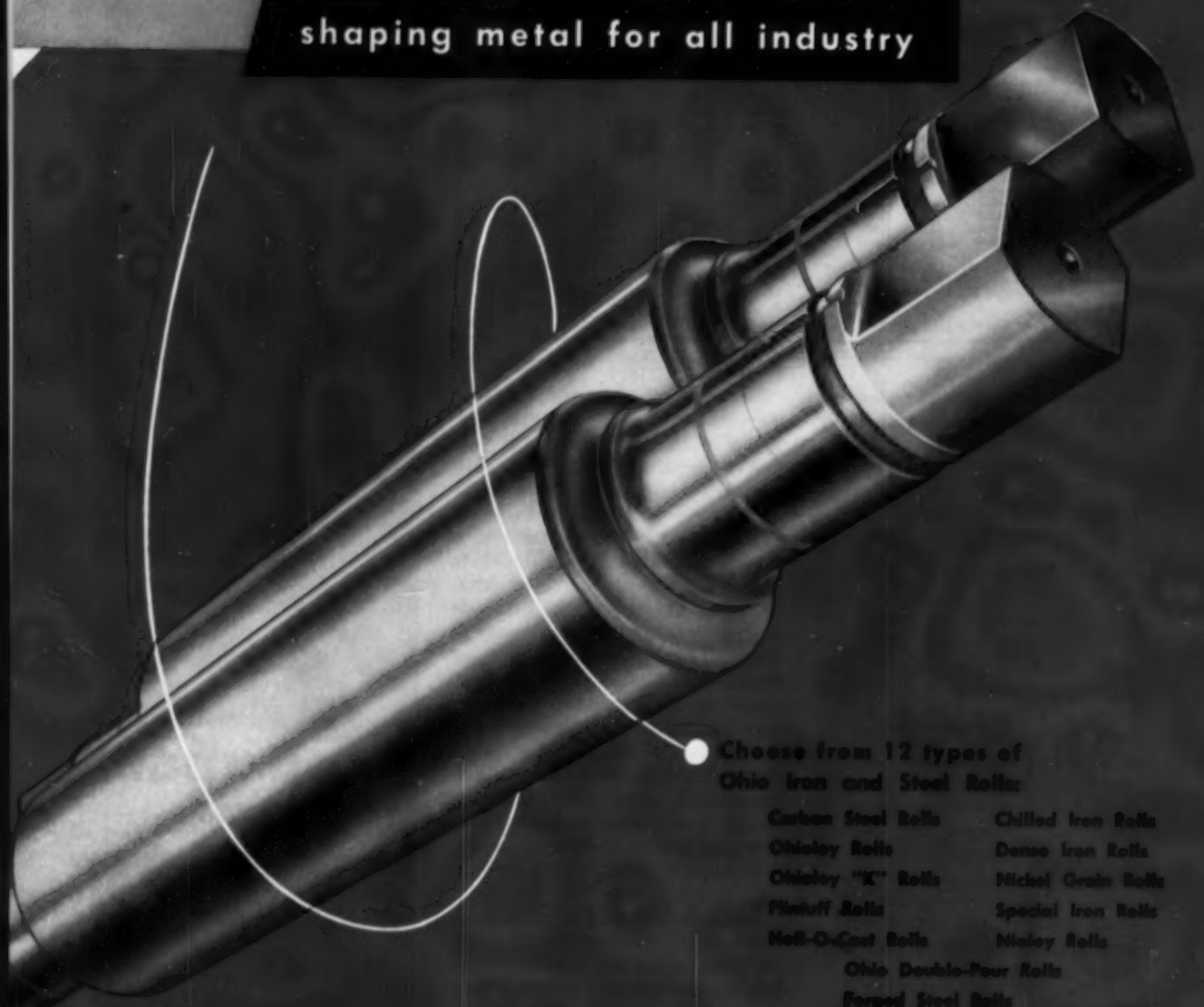
CHROME ALLOY AND STAINLESS
COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls

shaping metal for all industry



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- Forged Steel Rolls

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

L. R. MILLER
. . . Trent Tube chief engineer

LOUIS G. PROBST
. . . heads operations at Eljer Co.

KARL A. KRANTZ
. . . Cleveland Worm & Gear p. a.

L. R. Miller was appointed chief engineer, **Trent Tube Co.**, East Troy, Wis. He has been chief metallurgist since joining the company in 1945.

Clark Equipment Co.'s axle division, Buchanan, Mich., appointed **L. M. Gray** chief engineer; **G. C. Vanderberg**, engineering consultant; and **William E. White**, new development engineer. Mr. Vanderberg had been chief engineer of the division since 1937.

Robert G. Hess was elected executive vice president of **Walworth Co.**, New York. He recently resigned as executive vice president of Pesco Products Division, Borg-Warner Corp.

A. F. Herold joined the executive staff of **Union Chain & Mfg. Co.**, Sandusky, O. His duties will pertain largely to production of company products. He has been connected for many years with the New Departure Division of General Motors Corp.

John Woodward was made assistant general manager and **Byron E. Smith**, plant engineer for **Scott-Atwater Mfg. Co.**, Minneapolis. Mr. Woodward transferred from his position as works manager with McCulloch Motors Corp., Los Angeles, which merged with Scott-Atwater earlier this year.

Murray Corp. of America appointed **Louis G. Probst**, vice president, to head operations of its division, **Eljer Co.**, Pittsburgh. He succeeds **C. H. Menge**, who resigns to fill an executive position with General Motors Corp. Mr. Probst has been with Eljer for 27 years.

Strong Steel Foundry Co., Buffalo, promoted **Calbraith P. Champlin Jr.** from assistant to the president to assistant plant manager. **Gerald T. McKee**, assistant sales manager, was promoted to sales manager.

O. J. Skawden was named vice president of **Sutton Engineering Co.** He continues as chief engineer at the firm's Bellefonte, Pa., plant. **Ray A. Bland** was made sales manager of the mechanical equipment department with headquarters in Pittsburgh. **William R. Heck** joined the firm as a sales engineer.

George T. Smith was made vice president-sales at **Ace Drill Bushing Co. Inc.**, Los Angeles. He was sales manager. **George Clement**, production manager, was made vice president-manufacturing to succeed **Del Herrick**, now vice president for special assignments.

Donald B. Gillies retired from **Republic Steel Corp.**, Cleveland, after 50 years' service. He was a vice president until his 75th birthday in 1947 when he became a mining consultant for the corporation.

Karl A. Krantz joined **Cleveland Worm & Gear Co.** and its affiliate, Farval Co., Cleveland, as purchasing agent. He formerly held that position with Thompson Products Inc., replacement division.

Burt Glazer was elected vice president, **Dulien Steel Products Inc.**, Seattle. He succeeds **Gilbert E. Rosenwald Jr.**, resigned. His duties involve management of the Seattle yard; also outside selling and buying.

Jules A. Mack was appointed chief engineer of **Hubbard Co.'s** pole line hardware division, Pittsburgh. He has served Hubbard for the last year as a research and development engineer.

Theodore A. Jagen was made manager of the Clark Township plant of **Hyatt Bearings Division**, General Motors Corp., Harrison, N. J. He succeeds **Alton H. Lundius** who is on an extended leave of absence due to illness.

Jack J. Begley was named vice president - manufacturing, **Colson Corp.**, Elyria, O. He joined Colson earlier this year as assistant to the president.

Indiana Forge & Machine Co., East Chicago, Ind., appointed **E. J. Carlson Jr.** vice president-sales; **Vernon H. Lorenzen**, personnel and production manager; **M. W. Finton**, esti-

ROBERT L. STOCKUS
. . . Farrel-Birmingham rolling mill post

J. E. WILLIAMS
. . . Western Brass Mills v. p.-gen. mgr.

BERNHARD W. WEBER
. . . heads Metal & Thermit mfg.

mator; and **Len A. Bernier**, Detroit district representative.

Farrel-Birmingham Co. Inc., Ansonia, Conn., appointed **Robert L. Stockus** manager, rolling mill sales. He succeeds **George F. Schaefer**, retired. **Howard E. Kuehn** was made division engineer, rolling mills.

Dr. A. Eugene Schubert was named manager of **General Electric Co.'s** chemical development department at Pittsfield, Mass. He was engineering manager, chemical materials department. **Richard A. Steenrod** was made a materials engineer for the silicone products department at Detroit.

Robert Allen fills the new post of consultant on machinery sales at **Crown Cork & Seal Co. Inc.** He has headquarters at Baltimore.

R. A. Aeberly was made Los Angeles district manager for **Electro Metallurgical Co.**, a division of Union Carbide & Carbon Corp., New York. He replaces **S. L. Jackson** who transfers to New York.

Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y., appointed **James M. Dill Jr.** assistant to vice president-sales; and **Ward K. Jones**, assistant office sales manager.

Howard Heidenburg was made senior assistant superintendent, **Donner-Hanna Coke Corp.**, Buffalo, to succeed **Roe M. Lotz**, retired.

J. E. Williams was elected vice president and general manager, **Western Brass Mills Division**, Olin Mathieson Chemical Corp., with headquarters at East Alton, Ill. He also will direct the company's brass mill operations at New Haven, Conn. Mr. Williams was vice president-operations for the metals division.

Thomas J. Kelly was made an assistant manager, sheet and strip sales division, **Republic Steel Corp.**, Cleveland. He was special assistant to the division manager.

Frank H. Wark Sr. was made director of engineering, **Wheeler Associates Inc.**, Cleveland. He was chief engineer of the St. Joseph Division of Whirlpool Corp.

Durez Plastics Division, Hooker Electrochemical Co., appointed **Lewis J. Pentland, Evan E. Graham** and **Henry B. Puff** district sales managers for New York, California and Chicago, respectively.

Gerald C. Romig was elected president, **American Chemical Paint Co.**, Ambler, Pa. He succeeds **Leon Cherksey**, now chairman.

T. V. Purvin was named president of Hupp Aviation Division, newly formed by **Hupp Corp.**, Detroit. He was general manager of Amgears Inc., subsidiary. The new division will co-ordinate manufacturing plants at Chicago, Cleveland and Greenville, Mich.

Bernhard W. Weber was named to head manufacturing operations of **Metal & Thermit Corp.**, New York, with the title of manager of manufacturing. He succeeds **Walton S. Smith**, vice president- manufacturing, who retired. **H. Alfred Rack**, formerly engineering manager, succeeds Mr. Weber as production manager. **Donald W. Oakley** transfers from assistant production manager to technical adviser to the president. In this post he succeeds **A. James Fisher**, recently named general sales manager.

John H. Long, assistant to vice president - contracting, **American Bridge Division**, U. S. Steel Corp., transfers from the Houston office to New York. **Walter Schielke**, contracting manager at Birmingham, was promoted to assistant to vice president - contracting, and transferred to Houston.

Aluminum Mfg. Co., Manitowoc, Wis., appointed **Nicholas B. Jagemann** director of a new department to be known as New Product Ventures. It will deal with research, market studies and development of new products.

Russell S. Whitehead was promoted to southeast district sales manager, **Electro Refractories & Abrasives Corp.**, covering the St. Louis to Birmingham area. **Donald W. Withrow** was made sales representative, Birmingham area. **Arthur L. Rose Jr.** will represent the com-

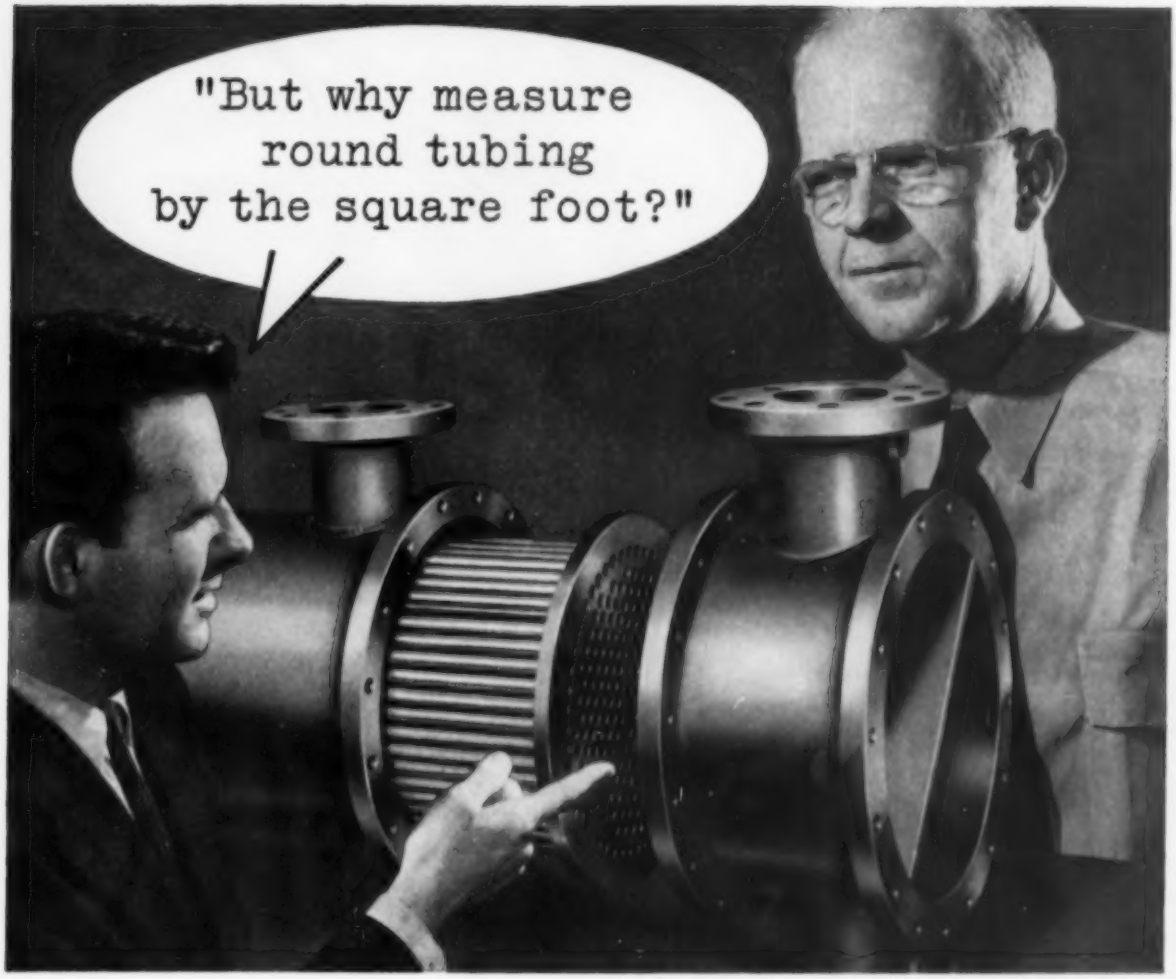

Photo courtesy Ross Heat Exchanger Division of American-Standard, Buffalo, N.Y.

"Because Ross Heat Exchanger Division has to be able to tell its customers how much cooling surface they're getting. That's a vital factor in a heat exchanger."

"I get it. That's why they use so many small tubes, instead of a few large ones. And Superior supplies the tubing?"

"Right. Stainless is the most popular, in ⅜ in. or ⅝ in. OD. But they order other analyses, too. The tubing has to have thin walls to perform the heat exchange function efficiently. It has to be strong to withstand the system pressure. And it's got to have smooth, clean inner and outer surfaces to minimize any pressure drop. Finally, it has to be tough, yet ductile enough to make installation easy."

Lend an ear, Mr. Design Engineer. They're talking about Superior tubing. The unit under discussion is made by Ross Heat Exchanger Division of American-Standard, one of the leading heat exchanger manufacturers. Superior tubing gives them the quality and dependability they like to build into their products.

This is only one of the many applications of Superior tubing in industry. We offer a wide range of tubing sizes in over 63 analyses, including stainless, carbon and alloy steels, nickel and nickel alloys, beryllium copper, titanium and zirconium.

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A. J. COX
. . . div. mgr. of Blaw-Knox plant

RALPH H. SCHOLL
. . . National Roll & Foundry sales post

MAYNARD W. JOHNSON
. . . heads General Electric dept.

pany for grinding wheel sales in the Detroit area.

At **Blaw-Knox Co.'s** construction equipment division at Mattoon, Ill., **Robert P. McKenrick** was made vice president-sales of all construction equipment manufactured at Mattoon, Pittsburgh and Elyria, O., plus new products presently under development. **A. J. Cox** was made division manager of the Mattoon plant in charge of all activities except sales.

W. C. Hurson, chief of traffic and steel procurement for **Youngstown Steel Door Co.,** Youngstown, was named to the Chicago sales force. He is succeeded by **Paul R. Peters. Paul Avery** was named purchasing agent of mill supplies and specialties.

Harry E. Eldridge was appointed Boston district manager of **American LaFrance Corp.**

Oscar E. Holt was made manager of the Old Forge, Pa., plant of **W. L. Maxson Corp.**

Charles P. Whitehead was elected president of **National Roll & Foundry Co.,** Avonmore, Pa. He also is president of General Steel Castings Corp. of which National Roll is a subsidiary. **Ralph H. Scholl** was made manager-roll sales and **William Johnston Jr.,** manager-castings sales. Mr. Scholl was manager of roll sales for Birdsboro Steel Foundry & Machine Co. Mr. Johnston has served National in sales for several years.

Dale W. Patrick was elected president of the Colona Division of **Pittsburgh Screw & Bolt Corp.,** Pittsburgh. He was made vice president-sales in 1952.

Richard T. Coyne was made Denver district sales manager for **American Steel Foundries** to replace the late **Frederick H. Bassett.**

John K. Deasy was named assistant vice president-purchasing and traffic for **Weirton Steel Co.,** Weirton, W. Va., division of National Steel Corp.

Maynard W. Johnson was appointed general manager, large motor and generator department, **General Electric Co.,** at Schenectady, N. Y. He was plant manager at Oakland, Calif., for the distribution transformer department. Mr. Johnson replaces **Joseph F. Eckel** who was graduated recently from the second advanced management course at GE's Management Research & Development Institute.

Vickers Inc., Detroit, appointed **Frank L. Moncher** chief engineer-airborne products. He was assistant director of research and development. **Paul C. Mortenson** joined Vickers as chief engineer-ground mobile products. He was with Massey-Harris-Ferguson Inc.

R. W. Cloues was made chief engineer, **Pittsburgh Bridge & Iron Works,** Rochester, Pa. **H. R. Cameron** was made consulting engineer.

E. D. Wilgus was made vice president and general manager, **Aviation Developments Inc.,** Burbank, Calif.

OBITUARIES . . .

Chester H. Kimmel, 53, president, **Ohio Crankshaft Co.,** Cleveland, died July 12.

Dr. Oscar E. Harder, retired assistant director of **Battelle Memorial Institute,** Columbus, O., died July 10.

Herbert R. Simonds, 82, chairman, **Simonds-Worden-White Co.,** Dayton, O., died July 6.

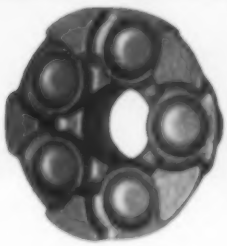
Henry E. Miller, 63, purchasing agent, **Carolina Steel & Iron Co.,** Greensboro, N. C., died July 4.

L. D. Cook, sales engineer in Detroit for **Bart Mfg. Corp.,** died July 30, in a mid-air collision of two airliners over Grand Canyon.

Jack S. Lusby, 51, a founder and president of **Buffalo Die Supply Co.,** Buffalo, died July 7.

Emil A. Hoffman, 77, vice president, **American Screw Machine Products Inc.,** Chicago, died July 7.

Radiator shell, a deep-drawn stamping made of 16-ga. steel, in two sections, approximately 26 inches wide, 28 inches high, 10 inches deep.



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read how you can save up to $290 a day in cupola coke consumption

Here are other helpful Whiting bulletins that can help answer your Hot Blast questions

"How To Make Your Cupola Operation More Efficient"—FO-1

"Hot Blast For Better Melt, Closer Control, Greater Economy"—FO-3

"Review Of Foundry-Cupola Gas and Temperatures"—FO-9

"Suggestions For Solving Some Cupola Operation Problems"—Bulletin FO-8

Based on an average 400-ton per day cupola melt, pre-heated blast can raise metal temperatures and at the same time create a 28% coke savings! This is possible at an expenditure of only $45 in gas fuel, giving an actual fuel savings of $290 per average work day and many thousands of dollars per production year.

Now any cupola can be converted at low cost with a Whiting-Thermo Hot Blast Heater to provide the highest efficiency in hot blast. Whiting has prepared a new booklet on this cost cutting hot blast heater which tells about all hot blast advantages. It also fully describes burners, combustion chambers, heat exchangers, air booster fans, control panel and controls, auxiliaries, and air by-pass as well as general design features. Write for this free booklet today! Ask for Bulletin FY-174. Ask for the other bulletins shown also!

WHITING

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Gas Maker Expands

Air Reduction to build plant in Los Angeles as part of multi-million dollar program

AIR REDUCTION Pacific Co. will build an air liquefaction plant in the Los Angeles area. It will have a daily rated capacity of 55 tons of high purity oxygen, 15 tons of liquid nitrogen and 3.5 tons of liquid argon. Cost of the plant, including related delivery facilities, will be more than $7.5 million.

The plant is scheduled for completion during the second half of 1957. It will supply the rapidly increasing demand for oxygen, nitrogen and argon in the California, New Mexico and Arizona industrial areas. It will serve primarily the steadily increasing needs of the steel, metal fabricating, aircraft, chemical and food processing industries, as well as needs of the armed services.

Air Reduction Pacific Co., headed by H. P. Etter, president, with headquarters in San Francisco, is the West Coast Industrial Gas & Welding Products Division of Air Reduction Co. Inc., New York. The Los Angeles district is supervised by E. W. MacCorkle, vice president of Air Reduction Pacific.

$16-Million Program — Air Reduction operates large air liquefaction plants in Butler, Pa., and Riverton, N. J., and is constructing one in Chicago. The company awarded a contract to Luria Engineering Co., Bethlehem, Pa., for erection of a standardized steel building to house new equipment which will double output of industrial gases at the Butler plant. The expansion will make an additional 110 tons of gases a day available.

(*Please turn to page* 68)

New Procedure Cuts Time for Motor Rebuilding Jobs

Engineers of U. S. Steel's Columbia-Geneva Steel Division teamed with General Electric specialists to save more than five days' down time on a normal ten-day maintenance job at the Geneva (Utah) Works. Only four days were required to set up and replace the armature and one-half set of the field coils on a 7000-hp double-armature motor used to drive the reversing rougher's rolls. Time was saved by fabrication and preassembly of major parts in a special fixture at GE's Schenectady, N. Y., plant. The innovation will be used at Geneva on all motor rebuilding jobs of this type. Shown above: A set of field coils being removed

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PORTABLE NIBBLER *that* CUTS
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Model HN for 10 gauge Stainless Steel and 8 gauge Mild Steel. 6" radius.

Without Distortion!

A big statement . . . and only Fenway can make it! Our portable Nibblers have solved unusual problems for hundreds of users. Complete line includes the 14 gauge Nibbler and a light-duty 18 gauge Nibbler, and a special 90° head for each.

RCA—DU PONT—GENERAL MOTORS—and many others, use Fenway Portable Nibblers!

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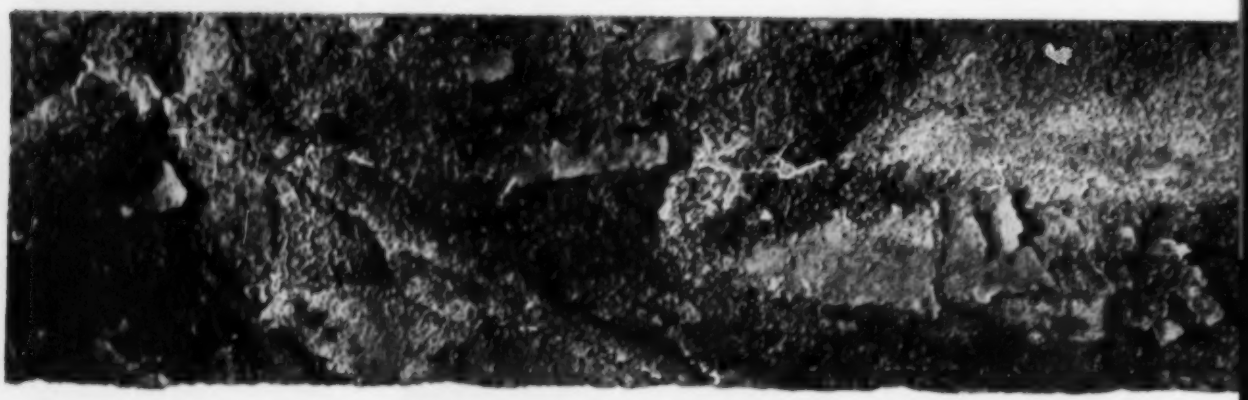
HELPING YOU CUT THE STAGGERING COST OF

CORROSION



IS KOPPERS BUSINESS

Corrosion will cost American industry more than seven *billion* dollars this year! And many more billions of dollars worth of capital equipment will be corroded away in the years to come. To help cut this enormous, and largely needless, waste is an important part of Koppers business.

As the world's leading producer of coal tar base enamels and coatings, we have devoted many years and many man-hours of laboratory research and field work to the problem of *preventing* corrosion. Probably we have within our extensive organization more useful knowledge and experience in corrosion prevention than exists in any other single place. To put that knowledge and experience at your disposal in cutting your corrosion costs, we are initiating a series of informal reports. The first of the series appears at the right.

We hope you'll find these reports on "How to Cut Corrosion Losses" both interesting and helpful. To make them so, we'd like to know about your corrosion problems—especially the unusually difficult ones.

Write: Koppers Company, Inc., 1301 Koppers Building, Dept. 101G, Pittsburgh, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala.

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COATINGS AND ENAMELS

how to
CUT CORROSION LOSSES
a report by Koppers Company, Inc.

W. E. Kemp,
Manager of the Technical Dept.

Although corrosion losses are never listed on a profit and loss statement, they represent a considerable—and often unnecessary—loss to every industry. Preventing this loss is a big part of our business as the world's leading producer of coal tar base enamels and coatings.

* * *

Many times every week we get a phone call, wire or letter asking the same, often harried, question: "Can you help me with this corrosion problem . . . ?" In most cases, we *can* help, and are most happy to do so. In fact, our Coal Tar Technical Department is designed to facilitate such help.

Basically, we have two groups within the Technical Department—the Development Group and the Technical Service Group. They are both headquartered at Verona, Pa., in a new building with the latest facilities for laboratory work and pilot plant operations. This building also houses the Quality Control staff of the Tar Products Division. These ten chemists cross-check the quality control operations of each plant.

Our Development Group consists of a General Supervisor, Mr. Frank Charlton, and two project leaders who supervise the activities of nine chemists and engineers. They work constantly to up-grade the effectiveness of Bitumastic coatings and to develop new coal tar coatings.

Our Technical Service Group, supervised by Mr. C. U. Pittman, also includes two project leaders and four laboratory workers. These men work in close liaison with our customers, distributors and sales engineers to help them specify the best coating and the most economical application for the job.

We also retain the services of two widely-known coating and corrosion scientists: Dr. W. F. Fair, Jr. and Mr. R. C. Stromquist. Both of these men—and each member of the Technical Department supervisory staff—have had more than 20 years' experience in the bituminous coating field. Dr. Fair and Mr. Stromquist work with all departments and, through first-hand field experience in their extensive travel, alert us to customer needs for new or modified protective coatings.

* * *

Naturally, many of our technical personnel participate quite actively in industrial and technical organizations. One of our coatings consultants, Dr. W. F. Fair, Jr., actually is serving full time this year as president of the National Association of Corrosion Engineers. Altogether, 70% of our men are members of scientific and technical societies. They participate actively on committees working on industry-wide problems.

In future columns, we plan to report to you on specific corrosion problems in such industries as steel, gas, petroleum, water supply and sewage and industrial wastes. In the meantime, we'd like to hear about your problems. Write to Koppers Company, Inc., 1301 Koppers Building, Dept. 101G, Pittsburgh, Pa.

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Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.

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NOW—Better and Safer than Ever!

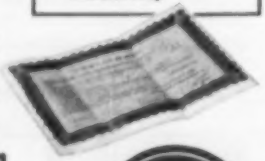
• ACCO *Registered* Chain Slings—long recognized as the standard of excellence—now give users a double bonus of safety and quality. They incorporate ACCO's new Shaped Section Master Link plus ACCO's sensational Accoloy X-Weld 125 chain.

The new Shaped Section Master Link, without any increase in weight, withstands deformation under loads up to 18% greater than a standard round section can. And the Accoloy X-Weld 125 chain—with its extra-strong, king-size welded area and its non-kinking feature—assures extra ruggedness and better service.

Because of these two spectacular improvements, there is more reason than ever for standardizing on ACCO *Registered* Slings. For additional interesting information, call your ACCO *Registered* Distributor—or write our nearest District Office.

WHAT "ACCO REGISTERED" MEANS . . .

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling



ACCO

American Chain Division

AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

(*Concluded from page 65*)

These projects are part of a $16-million expansion program for 1956, which consists of enlarging two existing plants, building three new ones and increasing the distribution activities of the company in some areas.

Beryllium Corp. Opens Branch

Beryllium Corp., Reading, Pa., opened a warehouse at 17187 Wyoming Ave., Detroit, Mich. It carries stocks of beryllium-copper master alloys, casting ingots, rod, bar and billets.

Gilbert-North Changes Name

Gilbert-North Inc., Greenville, Pa., changed its name to Stainless Scrap Corp. The firm recently completed a $125,000 construction and equipment expansion at its plant and is planning further expansion of its facilities.

Lincoln Electric Expanding

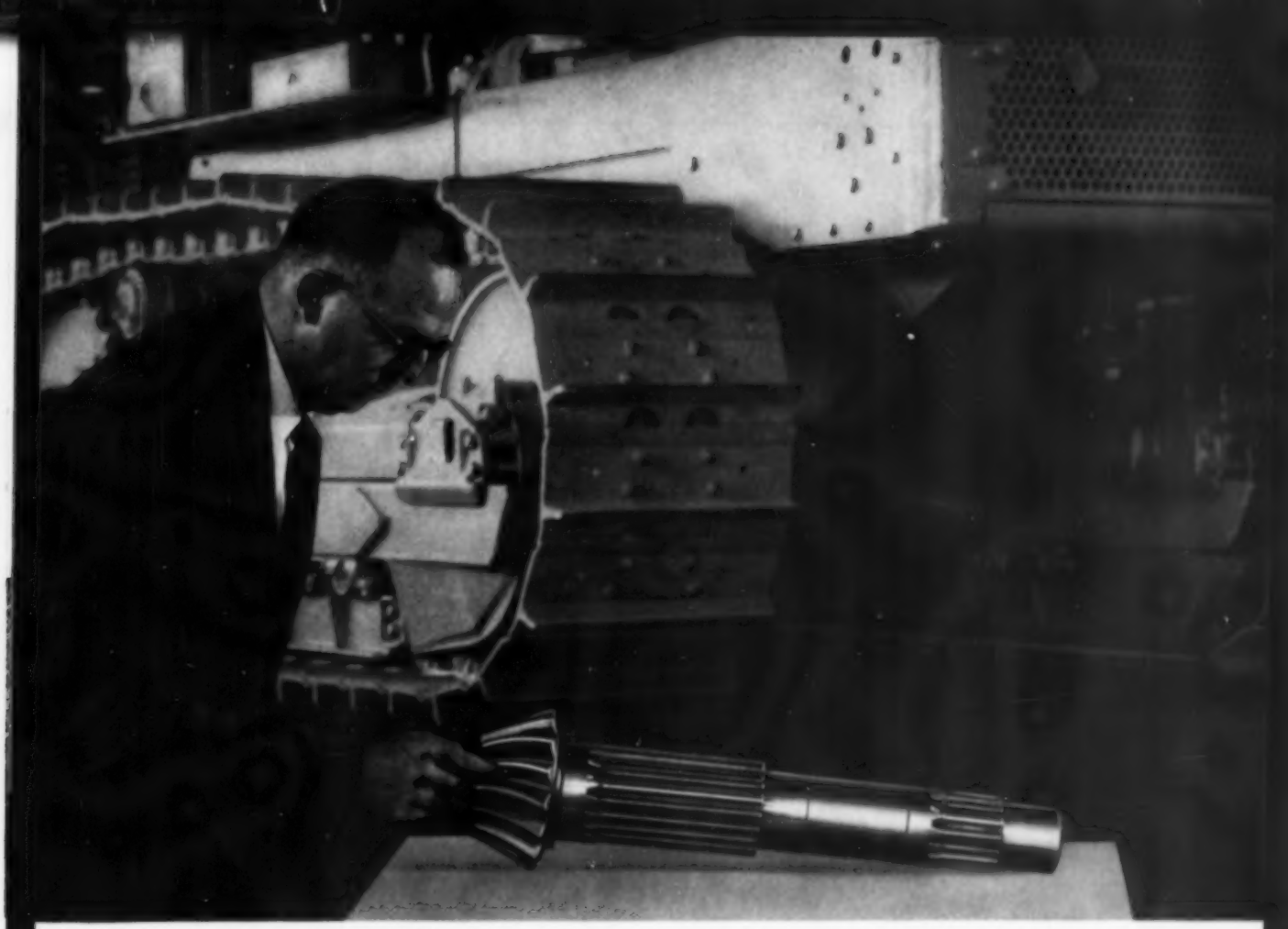
Lincoln Electric Co., Cleveland, launched a three-year, $8-million expansion program which will add 60 per cent to the manufacturing capacity of its plant. New capacity will be for arc welding machines and electrodes. Work is under way—$2 million is expected to be spent by the end of the year.

Will Process Low Grade Ores

Strategic Materials Corp. of Buffalo and Montreal, Que., plans to build a plant in the province of New Brunswick, Canada. Cost will be between $12 million and $15 million. A smaller prototype plant is under construction near Niagara Falls, Ont. The plants, equipped with electric furnaces, will use a new process to recover ferromanganese and other metals from low grade ores.

Oliver Iron Sells Division

Oliver Iron & Steel Corp., Pittsburgh, sold its Pole Line Materials Division to Electrical Mfg. Co., Battle Creek, Mich. George C. Price, president of Electrical Mfg., will head the new firm. G. Mayne Daly, former Oliver general manager of sales, has been named vice



Caterpillar Tractor Co. Metallurgist T. H. Spencer inspects final drive pinion for D9 crawler tractor weighing 28 tons. Severe loading of this large pinion requires a steel with high case and core hardenability. Several years ago Caterpillar Tractor Co. found that simply by increasing the molybdenum content of AISI 8622 (to 0.30-0.40%), the desired properties were obtained at lower cost than was possible in any of the standard carburizing grades.

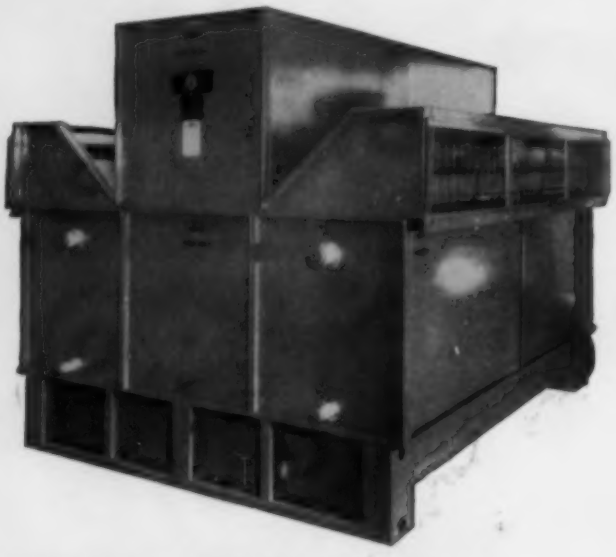
Caterpillar Tractor Co. improves case and core hardenability of carburizing steel by increasing molybdenum content

"Drive pinions in tractors must take very high torque loads," says T. H. Spencer, Metallurgist for Caterpillar Tractor Co. "AISI 8622 steel, which we had been using, couldn't give us the hard case and strong, tough core we needed in these heavy sections. Other standard carburizing steels with the requisite properties would have cost substantially more. We found, however, that we could achieve the desired surface and core properties by simply modifying AISI 8622 with a higher percentage of molybdenum. We have been using this composition for several years, and results have been excellent."

Caterpillar Tractor Co.'s experience shows how increasing molybdenum in a carburizing steel helped to solve a specific problem. Perhaps your product, too, can benefit by higher molybdenum content.

A technical article, "New Carburizing Steels for Critical Gearing", describes some recent investigations of higher-moly carburizing steels. For a reprint, write Climax Molybdenum Company, Dept. 3, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM



NIAGARA SECTIONAL
***Aero* HEAT EXCHANGER**
gives close temperature control, saves you ***LABOR,*** *Power, Water*

- **Because the new design improves the heat transfer to the out-door air by evaporation.**
- **Because new features keep your equipment working for long life with "new plant" efficiency...always full capacity.**
- **Because you save 95% of cooling water cost.**

You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin 132. Ask for the full story of how you can save expense in your plant and improve your product's quality.

NIAGARA BLOWER COMPANY
Dept. S. 405 Lexington Avenue
NEW YORK 17, N. Y.
District Engineers in Principal Cities

NIAGARA — *Over 40 Years' Service in Industrial Air Engineering*

president-marketing. James H. Foote will direct a new research, product design and development group.

N.J. Zinc Sales Co. Dissolved

New Jersey Zinc Co., New York, dissolved its New Jersey Zinc Sales Co. Functions of the firm have been assigned to the parent company's sales department.

Closes Farm Machinery Plant

J. I. Case Co., Racine, Wis., will close its Anniston, Ala., branch plant before the year end. Operations of the plant, which manufactures farm machinery, will be transferred to Burlington, Iowa. The plant closing was due to failure of sales in the southeast to come up to expectations and to existence of better facilities at Burlington.

Pioneer Aluminum Inc. Formed

National Lead Co.'s subsidiary, Morris P. Kirk & Son Inc., Los Angeles, acquired the controlling interest in Pioneer Aluminum Inc. This company was formed to consolidate and carry on the activities of Pioneer Aluminum Supply Co., Pioneer Tool Engineering Co., Consolidated Casting Co. and Republic Smelting & Refining Co. Pioneer Aluminum Inc. is a distributor of aluminum sheet, bar, rod and aircraft extrusions; a manufacturer of cast aluminum plate and zinc alloy plate.

Walter Smith and Arnold Kunody will continue to actively manage the affairs of the new company as vice presidents, under the direction of J. P. Kirk, president of Morris P. Kirk & Son Inc.

NEW ADDRESSES

McKinney Mfg. Co., Pittsburgh, moved its midwestern regional sales office to larger quarters at 1316 Chicago Ave., Evanston, Ill. Glenn K. Rosenfelder is regional sales manager for this maker of builders' hardware.

Advertising department of **Haynes Stellite Co.**, a division of

BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary
BLAW-KNOX
1906-1956

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Foundry and Mill Machinery Division
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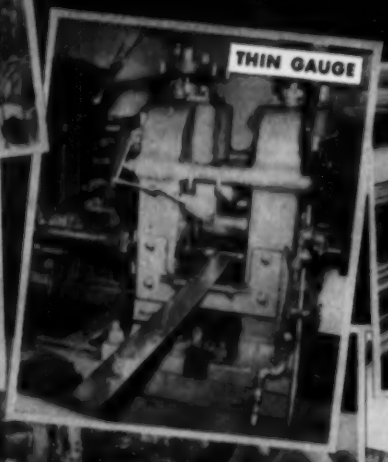
ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.

COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
Inquiries for small lots welcomed.



ULBRICH Stainless Steels

WALLINGFORD, CONN.

Phone: COlony 9-7771

Union Carbide & Carbon Corp., moved to room 2840, 420 Lexington Ave., New York 17, N. Y.

Thor Power Tool Co., Aurora, Ill., moved its Milwaukee branch office to 3911 W. Greenfield Ave. C. B. Bergren is Thor's Milwaukee branch manager.

VACATIONS

Warner & Swasey Co. will close its manufacturing plants in Cleveland and New Philadelphia, O., from Aug. 6 through Aug. 19 for employee vacations. No outgoing shipments will be made or delivery of incoming materials received at these plants during the period.

Air Brake Division of Westinghouse Air Brake Co. will close its plant in Wilmerding, Pa., July 28 to Aug. 12, inclusive, for inventory and vacation. Any shipments made during this period will be returned at seller's expense.

ASSOCIATIONS

Drop Forging Association, Cleveland, elected these officers for the coming year: President, Charles H. Smith Jr., Steel Improvement & Forge Co., Cleveland; vice president, Gordon R. Walker, Walker Forge Inc., Racine, Wis.; secretary-treasurer, Richard Marcus of the association staff.

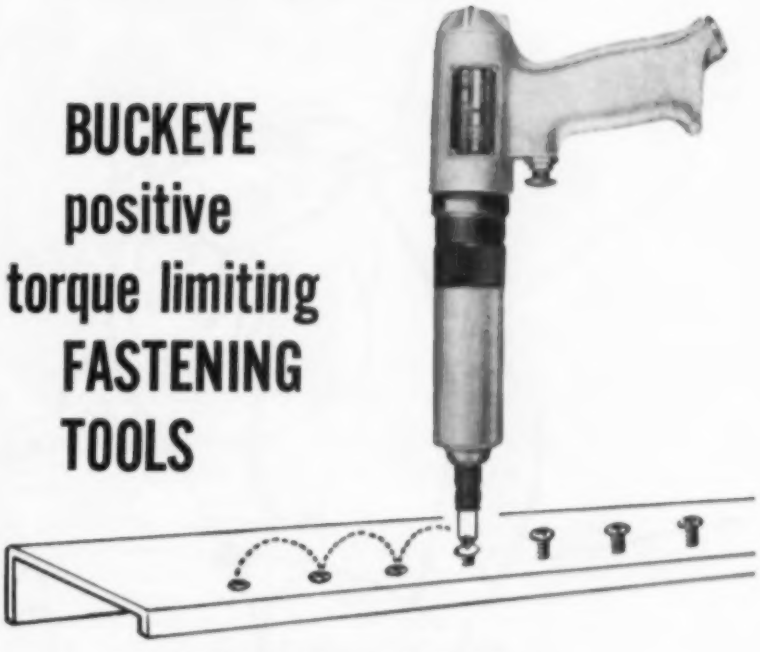
REPRESENTATIVES

Scully-Jones & Co., Chicago manufacturer of precision holding tools, appointed these distributors in their respective areas: Ekedahl Tool & Supply Co., Pittsburgh; Service Industrial, San Diego, Calif.

E. E. Graham & Co., Houston, was named a representative for **Trent Tube Co.'s** stainless steel and high-alloy pipe and tubing. Trent Tube Co., East Troy, Wis., is a wholly owned subsidiary of Crucible Steel Co. of America, Pittsburgh.

a **NEW** way...
to drive screws...to run nuts...

BUCKEYE
positive
torque limiting
FASTENING
TOOLS



Maintain Uniform Tightness
adjusts to any torque from 5 to 85 in./lbs.

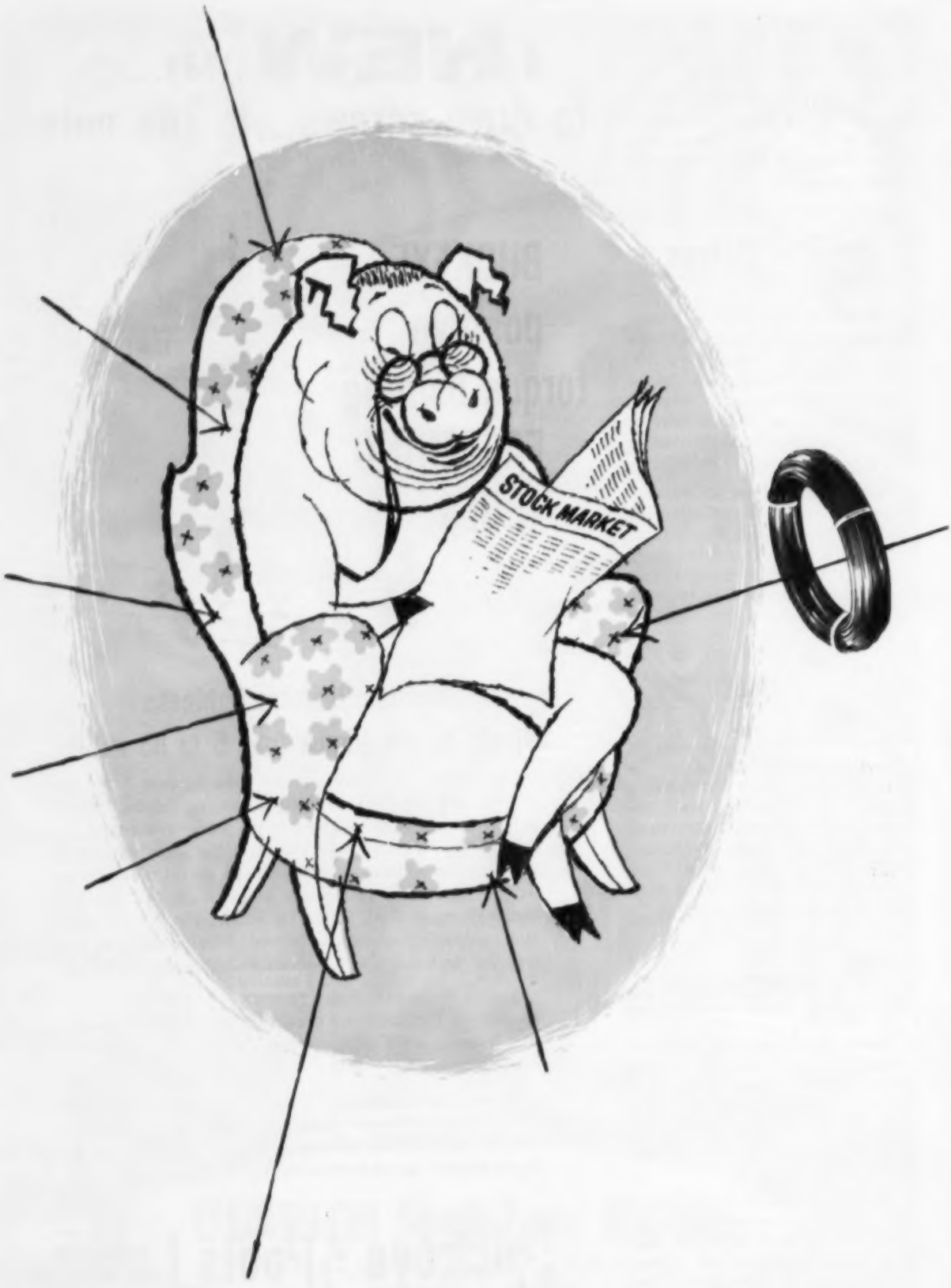
Set the torque—just once—at any point between 5 and 85 in./lbs., and this Buckeye Torque Limiting Fastening Tool is ready to go! Apply the tool to the work—it sets itself for driving—AUTOMATICALLY . . . and it stays set even if you vary the pressure on the tool. The instant the screw or nut hits home, and that pre-set torque is reached, the tool clutch disengages—AUTOMATICALLY, even if the operator maintains pressure on the tool. Now, remove the tool from the work and it will re-set itself—AUTOMATICALLY.

Simple. Foolproof. Every fastener is just as tight as the one before. The workpiece doesn't get scratched or damaged. The fasteners won't strip or shear. And your bits and sockets will last longer, too.

If you aren't doing your fastening work this NEW way, with a Buckeye Torque Limiting Fastening Tool, better write —NOW—for complete information. Better still, why not ask for an in-plant demonstration—there's no obligation.

Buckeye Tools
CORPORATION
DIVISION 12 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools


STOCK MARKET

hog rings that never see a hog

Not all hog rings are used to keep hogs from rooting up the ground with their snouts. One type is used by upholsterers to fasten burlap and similar materials. These rings are often made from a special hard drawn, low carbon CF&I-Wickwire Wire which is free from surface imperfections and wire-drawing lubricants.

Chances are you don't need wire to make hog rings. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades. Remember—
FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

IF YOU USE ANY OF THESE WIRES
IT'LL PAY YOU TO DISCUSS YOUR NEEDS WITH CF&I-WICKWIRE!

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armature Binding Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver
El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix • Pueblo • Wichita
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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York
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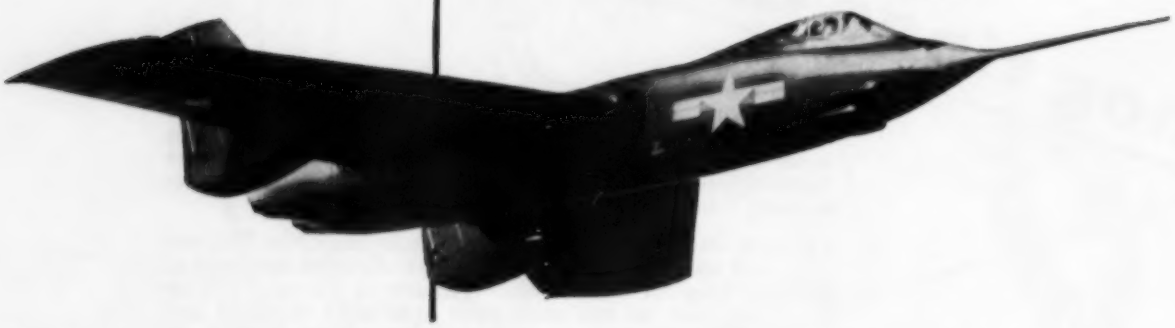
CF&I

4238

For your selection

ALTEMP

HIGH TEMPERATURE SUPER ALLOY STEELS



ALTEMP A-286 . . . an austenitic iron-nickel-chromium alloy made heat-treatable by the addition of titanium. Designed to maintain high strength and corrosion-resistance up to the 1350 F range, and to afford satisfactory scale resistance up to 1800 F.

A-286 was developed in the A-L Research Laboratory in Watervliet, N.Y., in the 1949-51 period. Among the high-strength, heat-resisting alloys, it has exceptionally low strategic alloy content, improved hot-working and machining qualities, and good center ductility in large sections. Currently used in jet engines and superchargers for such applications as turbine wheels and blades, frames, casings, afterburner parts, bolting, etc.

This alloy is readily produced in large quantities without the need of special steel-making equipment. It is available in the form of billets, bars, forgings, sheet, strip, tubing and hot-extruded shapes.

ALTEMP S-816 . . . a chromium-nickel-cobalt base alloy, strengthened by additions of molybdenum and tungsten, and with a columbium-carbon ratio of ten to one to insure its structural stability. Designed for high strength and corrosion-resistance service in the 1200-1500 F range, and at higher temperatures under lower stress conditions. Developed in the A-L Research Laboratory at Watervliet, N.Y. in the years of 1940-43, and engine-tested and proved for periods of over 30,000 hours.

S-816 is used currently for turbine blades in two of the production jet engines, also in a number of experimental aircraft and commercial gas turbines. Except for seamless drawn tubing, it is available in practically all forms and shapes in which stainless steels are processed, including hot extrusions.

ALTEMP S-590 was designed for service in the range of 1100-1400 F temperatures where high strength and corrosion resistance are required, and where cost is also a factor. Unlike S-816, which is practically a non-ferrous alloy, S-590 has a chromium-nickel-cobalt-iron base. However, it employs the same molybdenum and tungsten additives, and the same columbium-carbon ratio.

S-590 was developed at the Watervliet Laboratory and field-proved during the same years as S-816. It is available in the same shapes and forms, and is currently being used for turbine blades and wheels in experimental commercial gas turbines.

OTHER GRADES . . . among the many other Super Alloys made by Allegheny Ludlum are V-36, M-252, 19-9 DL, 19-9 DX and Waspaloy.

Do you have a high temperature problem? The services and experience of our Research Laboratories and Technical Staff are completely at your command. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

WSW 5310 B

WRITE FOR INFORMATION

Certified laboratory data on the properties of Allegheny Ludlum high temperature Super Alloy Steels are yours on request.

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Allegheny Ludlum

Stocks of AL Stainless Steels carried by all Ryerson warehouses

AL® LEADING PRODUCER HIGH-ALLOY STEELS

Technical Outlook

AUTOMATED HONEYCOMBING—An automatic machine is fabricating honeycomb cores up to 1 in. thick at Convair's Ft. Worth, Tex., plant. The operator feeds 0.0015-in. thick stainless steel ribbons into the machine from a spool. The machine bends the strip into a row of tiny ridges and valleys. The next stage forms a second row with identical ridges. The two rows are joined and welded at each spot where the ridges touch. The honeycomb is used in "major portions" of the supersonic B-58 bomber now in production at the plant.

HEAT SHEDDER— An engineer walked six times into an industrial furnace heated to 1200°F, stayed several minutes each time, and walked out without a singe. He was wearing a glass fiber insulated, aluminized fabric protective garment made by Fyrepel Products Inc., Newark, O. The suit, and other types using aluminum coated fabrics developed by Minnesota Mining & Mfg. Co., St. Paul, are saving lives and making hot zone repairs easier to perform.

LONGER VALVE LIFE— Applying a protective layer of aluminum-iron alloy to the working faces of internal combustion engine valves extends their life two to three times. The process consists of degreasing, induction preheating to 400°F, aluminum spraying and induction postheating to 1400°F to form the alloy film. Research work was done at Thompson Products Inc., Cleveland.

COLOR TO SUIT— When photo-sensitive pigment paint becomes a reality, the ladies will be able to change the color of their cars to suit their new outfits, says Del S. Harder, executive vice president, Ford Motor Co. Cars would come in a neutral white; playing an electromagnetic radiation gun over the paint would bring out the color you want. Another feature: The paint would be self-cleaning. It would expel dust and dirt from its surface when passed through an energy field.

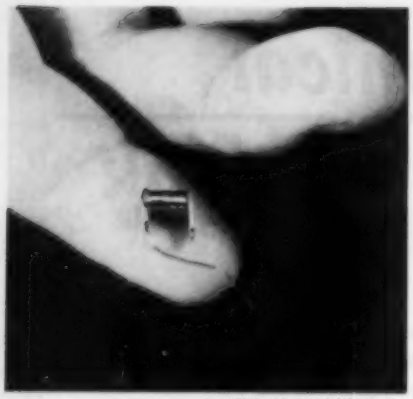
WRENCHING PRACTICE— A bolt does its hardest work when a joint is drawn up. Here's a formula from Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., to figure approximate torque for a bolt: Multiply the bolt load in pounds by the diameter in inches by 0.2. Example: A ½-in. bolt can carry a load of 4950 lb. Proper working load is 60 per cent, or 2970 lb. Torque equals 297 in. lb, which translates into a load of 37 lb pull on an 8 in. wrench.

BUTTERKNIFE— Linde Air Products Co., which made news a year ago with a Heliarc torch that cuts aluminum like butter, has boosted recommended thickness of aluminum for torch cutting to 1½ in. Speeds are up, too: 600 fpm cutting is possible with ¼-in. plate.

INCHWORM— An actuator which can produce linear motion under machine load that is accurate to plus or minus 5 millionths of an inch is replacing lead screws on centerless grinders in pilot operations. Called an Inchworm motor, it creates motion by magnetostriction which lengthens or shortens the armature with sufficient force to overcome stick-slip friction of the ways without backlash.

SPRUNG RUBBER—Wiremakers aren't defaulting to sponge rubber in the upholstery business. They're promoting wire springs embedded in sponge. Springs will keep the rubber from breaking down, they say.

Metalworking Outlook—p. 31 Market Outlook—p. 109



Elgin National Watch Co.

Everybody's talking about it. It's making news and profits in everything from trains to transistors. Here's what to expect when you hop on the band wagon

Miniaturization Is Big Business

MINIATURIZATION was little more than a word yesterday. Today it has become a driving force in the economy.

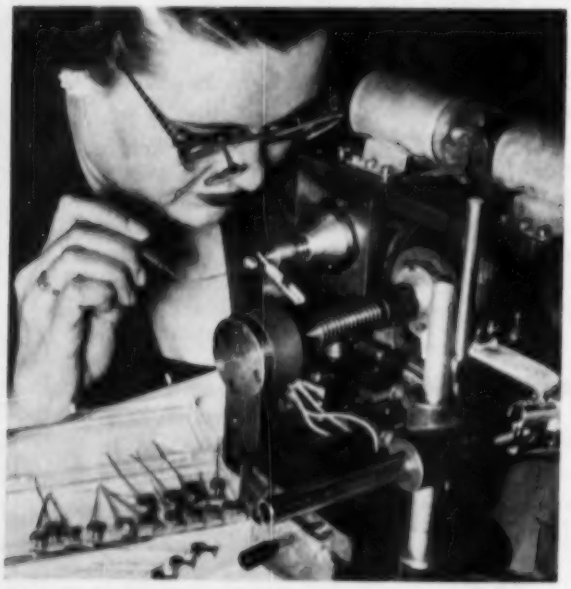
The demand is big for little things. Every time a smaller version of a product is announced, inquiries shoot up. The world of supersonic flight, TV, computers and ranch houses has made smallness a virtue and a market.

But there's more to miniaturization than smallness. It's a reduction of dimensions or weight *without loss of function*. You can easily stretch the definition to cover increased performance packed in the same space or weight.

Nothing New—It's an old idea. Like automation, the newest thing about miniaturization is the name —that and the demand.

It's easy to spot it in aircraft, but the dictating machine in the businessman's brief case and his auto air conditioner are equally good examples. The ultimate example is the earth satellite. Everything going into it represents a new frontier in miniaturization. The fact that it will be tailor-made brings up one of the classic problems of making things smaller.

Prototype—Your toolroom, conceivably, might build the satellite. Certainly, your drafting room would have no trouble preparing the drawings at 20 times scale



Machines may be hard to find for intricate jobs, like winding a microscopic coil with 200 ft of 1 mil wire. Elgin developed this one

It often takes special techniques (like this scale model which is 50 times larger than Elgin's Neomite relay) to train workers for miniature assembly

size. The ultimate challenge, if you could build it at all, would come when you try to make 20 an hour for months on end.

For mass production is the critical problem, say engineers at Elgin National Watch Co., Elgin, Ill. When former tolerances become major dimensions, scaling down production lines is not enough. You have to develop new concepts of manufacturing.

A watch company is used to little things. "Tolerances don't bother us—we've never known any business but miniaturization," says Elgin. Many companies with projects in smallness will take that advice and turn to manufacturers with experience in the field for counsel and production.

Self-Help—Others will go it alone. The furnace maker designing an underfloor heating unit is not likely to consider his project in the bailiwick of the watchmaker, but he may encounter comparable difficulties. You'll find some typical ones in the box on the next page.

In spite of the publicity given guided missiles and wrist watch radios, don't assume that this trend doesn't go deeper—much deeper. Remington Rand designed an office filing cabinet with five drawers in the space of the usual four. That is miniaturization. Eastman Kodak and others went farther and developed microfilming techniques that put whole files in a capsule.

Any Scale—The auto makers pulled in the hood and packed more power and performance under it. They sacrificed expendable running boards to get more usable inside room. House designers did about the same thing when they pulled out the wall between living and dining rooms. In each case, you can start a pretty good argument on whether the demand was

One of the most persuasive spokesmen for miniaturization is H. Thomas Hallowell Jr., president, Standard Pressed Steel Co., Jenkintown, Pa. Here's how he sees the picture:

Making More of Miniaturization

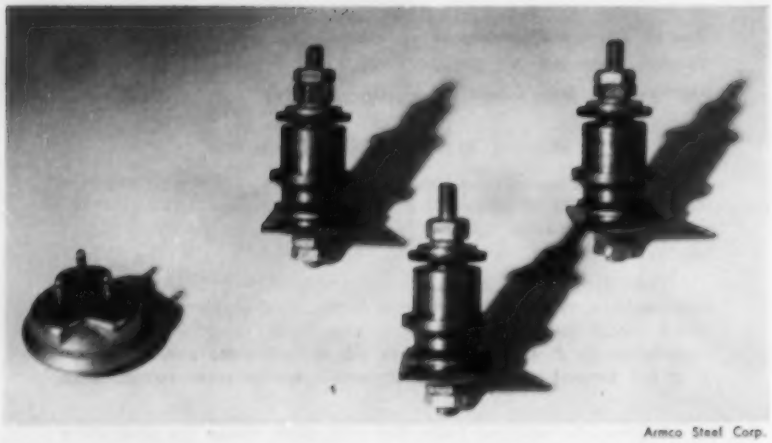
INDUSTRIAL management should make more of miniaturization—starting with its definition. It is shaping up as a vital force for increasing productivity, and for satisfying the rising standard of living.

The true purpose of miniaturization is to provide more utility, more service, more efficiency from diminishing expenditures of material, effort and money. Seen in this light, miniaturization has application to a wide range of industrial products and problems. It is not limited to the inherently small, nor to mere reduction in size.

It produces machine tools, but with many times the productive output of their predecessors. It is a frame of mind that puts computers to work to miniaturize clerical or engineering work. It encompasses a 300,000 kva transformer weighing 355 tons, but still no bigger than the 1949 version with only half the electrical capacity. It is planned, continuing increase in usefulness per unit volume or weight or man-hours.

Almost all products, including those already miniaturized—and even management organization and activities—are fair game for further improvement by miniaturization. The trend is so significant that probably the only thing to escape miniaturization should be our outlook on the subject itself.

When a speck of dust can ruin a product, production lines can come to look like this assembly area for miniature precision bearings at the New Departure Division of GM's Sandusky, O., plant



Armco Steel Corp.

Sometimes miniaturization brings classic simplicity, like this three-pronged terminal of stainless steel wire, cold-rolled steel and glass which replaces three complicated terminals for hermetically sealed refrigerator compressors

there first, or whether the new concept created the demand.

Arma Division of American Bosch Arma Corp., Garden City, N. Y., kept squeezing down the size of its gyrocompasses until the word "miniaturization" lost its savor. The latest model is a "subminiature" (it weighs 23 lb), and any day someone will turn up with a sub-subminiature product. Carter Mfg. Corp., Hudson, Mass., is advertising a "minimalized" potentiometer (diameter ¼ in.). "The relationship between 'miniaturization' and 'minimalization' is the same as that between 'smaller' and 'smallest,'" says Carter.

Beyond Names—In spite of the comedy of words, the intent is deadly serious. Because the gyrocompass is smaller and lighter, the plane can carry more fuel or armament; because of the potentiometer, a circuit can be fitted where one could never be fitted before. Each will make possible hundreds of changes and new developments. It is this snowballing effect that makes miniaturization such a fascinating and profitable business.

A jet engine will soon have a governor one-third the size of the former model. Its tolerances will be closer—in all ways, it will be a precision mechanism. It will require stronger, more carefully controlled raw materials. Because it is smaller, it may be necessary to beef up the feedback mechanism—to go to higher hydraulic pressures, for example. If maintenance is required, the repairman may have to acquire new skills. Maintenance in place may have to be replaced by bench, or even factory, maintenance.

The quantity of materials will be less, but because they are premium materials and manufacturing requirements are tighter, the cost of the mechanism may well be higher than the original's. There may be some small savings on the cost of packaging and shipping, but they will be insignificant compared with the cost of the product.

Rewards—These are typical consequences of miniaturization. With consumer goods, getting the costs down may be a bigger challenge than packing more product in. When the smaller, better product can be made for less (as L. J. Mueller Furnace Co., Milwaukee, found possible with its Climatrol furnaces), the benefits really strike home. Mueller was able to reduce its direct labor from 15 to 5 hours per furnace unit.

Sometimes, dividends come in another way. Lockheed Aircraft Corp. has developed a vest pocket TV camera (5 x 2 x 1¾-in.) for

Miniaturize with Your Eyes Open

MINIATURIZATION brings problems as well as profits. It's well to go into miniaturization with your eyes open—to be on the lookout for these things:

1. Design—Reduction of dimensions is only the beginning. Designers need a free hand: The miniaturized version may have to do the work of its big brother, but it shouldn't have to look like him too

2. Materials—Your regular suppliers may not be able to meet your new, more rigid requirements. You may have to develop new sources of supply

3. Labor—As you approach the lower end of the size scale, you'll need to employ more people trained to work with delicate things; instrument makers, model makers, diemakers. There'll be more women in your labor force. They have the patience and manual dexterity you'll require

4. Tools—You probably will have to build many of your own machines, or buy specials. Miniaturization demands tooling of extreme accuracy

5. Gaging—You'll probably have to do more of it, and to closer tolerances. If you haven't been working with micromeasurements, expect a big investment in special gaging and testing equipment, and in training people to use it

6. Costs—As size goes down, manufacturing costs usually go up

7. Handling—You may find yourself moving from the conveyor into the bread pan scale of handling. A dropped pill box can spill a day's production. There's a big opportunity for developing systems for handling and sorting small parts

close-up studies of aircraft control surfaces during flight. When you toy with the other possibilities for such a small package—logging wells, observing action in cramped quarters, following surgical procedures—you have a lot of the answers to "why miniaturize?"

A Seller—And don't underestimate the emotional appeal of pure smallness. It has sold countless watches, cameras, gadgets where other sales promotions have lagged. Even the illusion of smallness, created by color or imaginative design, has sales appeal. But smallness as an end in itself has limitations. Sometimes it defeats its purpose.

Shortly after the war, Sigma Instruments Inc., Boston, developed a reduced scale replacement for a popular Teletype relay. But it required an adapter to fit it to the standard relay mounting base, which was equivalent to fitting the works of an electric clock into a grandfather clock housing. The relay is still around, waiting for someone to produce a circuit with the small octal mounting for which it is intended.

New Twist—The story is different with doorknobs. The lock barrel has moved into the knob, although there is still plenty of room in the door for the older style separate installation. This is true miniaturization for sales appeal: Installation time has been drastically reduced, and the lock has the unobtrusive, functional look demanded in modern homes. Even if the new style costs more than the old, it will sell better.

The field looks virtually unlimited. "An intrstng exprmnt in spch," comments Bell Telephone Laboratories, describing a technique by which speech is electronically clipped so that more voices may share the telephone wires. Somewhere between clipped speech and the satellite, you fit into the picture. It will take new techniques, new skills, new materials—perhaps a whole new outlook. Miniaturization is worth it, say companies that have made it their business.

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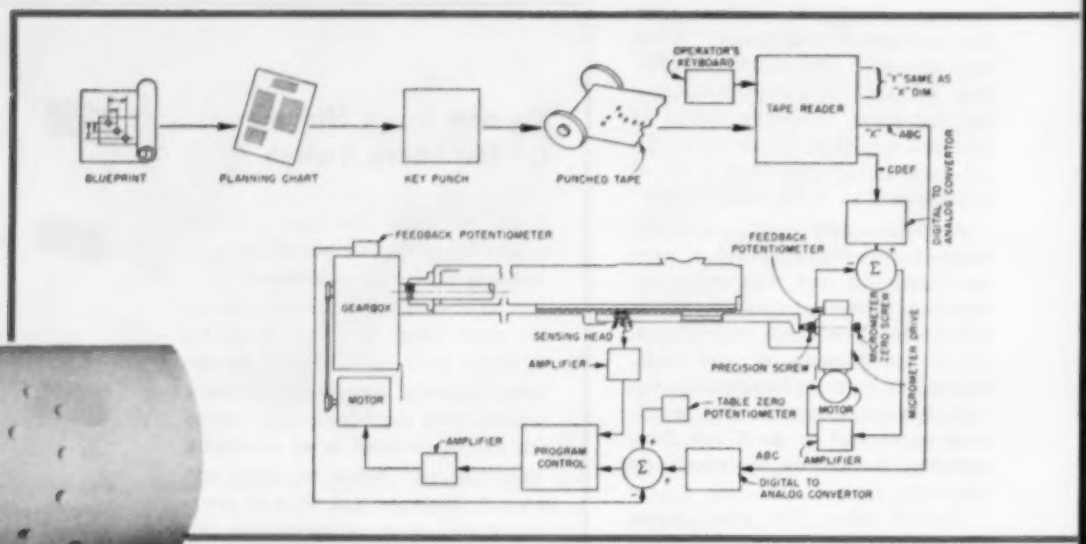
* *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Up and Down History Of the Micro Switch

THIS IS HOW the Micro Switch looked when it was introduced (1). Industry thought it needed more protection than the plastic case gave, so the sheet metal case was added (2). It didn't have an overtravel mechanism or conduit connectors, and users wanted more ruggedness. That led to the switch enclosed in an aluminum diecasting with better mounting and conduit facilities and built-in overtravel and, plenty of ruggedness (3). But now users wanted complete sealing. They got it (4) at the expense of a bigger, heavier die-cast enclosure (same microswitch inside). But they still weren't satisfied. They needed a switch they could drop castings on and run under water. They got that, too, (5) with a cast iron case and added explosion-proof features. It was big; it was strong; and it looked like the final answer. But it wasn't. The company decided it could be more versatile, and the result was an operating head that could face in four directions and an actuator arm adjustable through 360 degrees. Along the way, they changed the shape of the microswitch deep down inside (6). This was when industry decided it wanted smaller switches after all—but, of course, with all the abilities of the big one. Micro Switch compiled with a half size, whole performance version (7). And then a still smaller version. To get it, the switches inside were reduced to postage stamp size (8). Now that users had the miniaturization scent, the company chopped the size of its switches again, putting two in a sealed housing 1 in. in diameter (9). Look for a smaller version any day. Miniaturization at Micro Switch (a division of Minneapolis-Honeywell Regulator Co., Freeport, Ill.) has far from reached the end of the cycle.



Punched tape for controlling a jig borer

Numerical Control for Jig Borer

Pratt & Whitney system is flexible, requires no change in drafting techniques. It also works well on rotary tables; other applications are possible

THE JIG BORER is a natural for numerical control. It's one of the most accurate machines built, J. J. Jaeger, vice president and chief engineer, Machinery Division, Pratt & Whitney Co. Inc., told the American Society of Tool Engineers.

A good jig borer requires heavy construction because its components must have high stability. Generally, it is installed on a minimum number of leveling points and must carry all its stresses within itself. It can't depend on the foundation for rigidity.

Severe Tolerances—Slides must be scraped; a quality jig borer should not have deviations of more than 0.0001-in. in its complete travel, which may be several feet.

Numerical controls are set up around a basic co-ordinate system. Results can never be any better than the conformity of the machine to the geometry of the co-ordinate system.

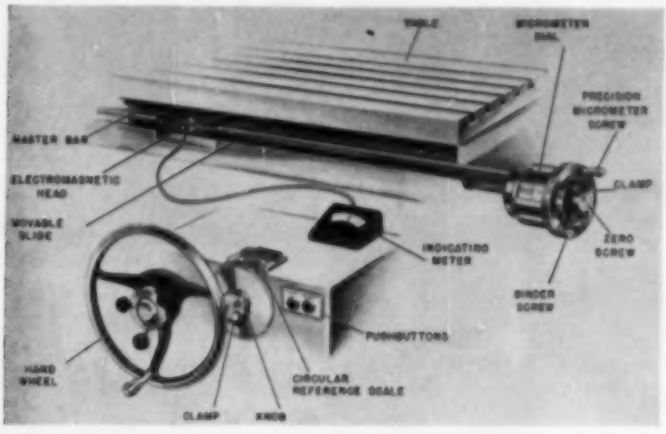
Measuring System—Heart of a jig borer is its measuring system. Pratt & Whitney engineers had a system particularly useful in jig borers, so they built their numerical control around it. The measuring system uses a bar with 1-in. spacings along its length. The spacings are sensed electromagnetically by a head which indicates its null position electrically.

Bars over 80 in. long can be built that have a maximum inch-to-inch and accumulated error of less than 0.000050-in. The bar is stabilized steel which has the same coefficient of expansion as the components of the machine in which it is installed.

To split each inch into its ten thousand parts, the sensing head is moved by a precision screw having 1 in. travel. Errors in positioning of the screw do not exceed 0.000010-in.

Control System—A block diagram of Pratt & Whitney's numerical control system is shown above. Information can be given to the machine through dials on an operator's keyboard or through a tape reader. The information is broken into groups for each of the X and Y or other co-ordinates.

This digital information is translated into electrical analogs by a converter. An analog voltage representing the first three digits of the operation establishes the approximate positioning of the slide.



Numerically controlled measuring system for a jig borer

Simultaneously, two analog voltages, representing the decimal fraction of the inch for the micrometer drive, position the sensing head.

Feedback Control—Power mechanisms drive the slide (and its feedback potentiometer) so the voltage from the feedback potentiometer is identical to that of the input information.

After the micrometer and table have been set to the digital information-voltages applied to them, the program controller connects the slide drive to the electric sensing head on the measuring bar. The slide moves at reduced speed until the null position is reached. The slide is clamped and the slide drive reversed to release strain.

Final Positioning—When several slides are to be positioned, they all begin to move simultaneously and independently. To check the slide position, the control automatically examines all setting units involved (feedback potentiometers and sensing head) to see that they are in the balanced condition.

For final positioning, the Pratt & Whitney jig borer uses a fixed program system. As a result, it always makes its final approach from the same direction and at the same speed regardless of the direction and distance that was required to bring it to the approximate position.

Decimal Code—Mr. Jaeger cites three big advantages of using a straight decimal code in the numerical control system: It facilitates proofreading of the tape by the keypunch operator or the machine operator. It demands the least adjustment by the user of the machine. It presents no technical complications in the data handling or setting equipment.

Processing—No changes in drafting techniques are necessary. Drawings are prepared as they always have been for jig borer operation. Hole locations are determined by co-ordinate dimensions from two base lines. Design of the numerical control allows base lines to be positioned anywhere within the range of the machine and provides co-ordinate information in decimal form as positive and negative numbers from the co-ordinate axes.

From the drawings, a planning chart can be prepared which lists the sequence in which the holes are to be bored. Each line of the chart contains all information pertinent to the hole (size, feed rates, spindle speeds, etc.).

Cutting Tape—From the planning chart, a manual keypunch cuts a tape. Each block of information (representing one operation on the part) is cut in a frame of tape. The tape is indexed to the next frame and the next bank of information is cut.

The tape, along with other pertinent data, moves to the shop where tape is inserted into the machine. The initial zero for the base line is located and the machine is zeroed. At any time, for corrections or other reasons, the operator can switch from the tape reader to the keyboard input and position the jig borer independently of the tape.

Flexible—The jig borer numerical control system is designed for extreme flexibility. A one-of-a-kind part or tool can be produced from drawings by giving the machine the information through the keyboard. The next hole can be preselected while the machine is in operation. Tools can be changed while the machine is moving to its new position.

When multiple pieces are required, change-over is rapid. Only initial zeroing of the jig borer is needed to pick up a new part. Any operation in a control sequence can be achieved without retooling. The data can be stored readily and a repeat on the same part set up with a minimum of time and paper work.

Production—Short runs of precision parts can be produced without elaborate setups and tooling. The machine can turn out in production quantities parts which have accuracy limits above those of conventional jigs.

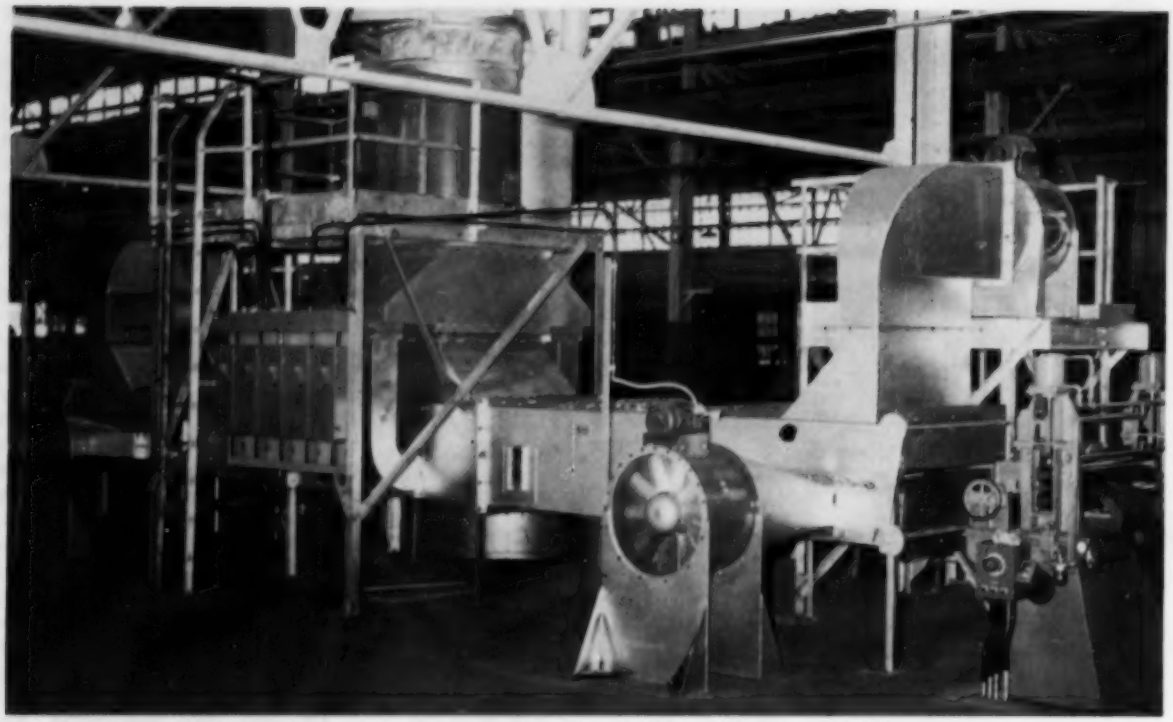
Although the description has been of the linear positioning of slides in a jig borer, the same system has been applied to rotary tables. This gives an integrated system of linear and angular positioning that can be controlled through a single tape reader.

Adaptable—Variations and additions to the control are possible. One device has been developed for shops working on nonferrous materials. Relatively few shops can provide constant temperatures for machines when working with nonferrous metals.

Since the measurement system and the machine have a coefficient of expansion different from that of aluminum or magnesium, a large variation in ambient temperature might cause a part to differ from the required dimensions when measured at standard 68°F.

Modified—The control system has been arranged so that a dimension would be modified as a function of distance, temperature setting and coefficient of expansion. This system can operate automatically, so that the dimensions are expanded or shrunk to the desired size at 68°F.

• *An extra copy of this article and the other two in this series are available until supply is exhausted. Write Editorial Service* STEEL, *Penton Bldg., Cleveland 13, O.*



Four fans pour 40,000 cfm of air into this cooling tunnel on the bluing line at Reeves Steel Co.

Tunnel Cooling Whips Space Problem

At Reeves Steel Co. in Dover, O., a 33 ft tunnel on the bluing line drops the heat of sheet steel 650°F while it passes through at speeds up to 150 fpm

PLANS for the bluing line at Reeves Steel Co., Dover, O., ran smack against a standard production problem: How to get maximum output from minimum space. There wasn't a standard solution.

Reeves put the problem to Sargent EnginAiring Co., Cleveland: Devise a system in 33 ft of floor space that will bring the strip temperature down from 850 to 200°F at economical speed. Sargent's answer was a straight line cooling tunnel.

No Loop—Reeves needed the line to assure a constant, high quality supply of blued sheet for its stove and stove pipe manufacturing operations. The original concept was to run coiled sheet continuously through a gas fired furnace and into a bluing steam chest. Coming from the steam chest at 850°F, it would be looped up to the roof and back for cooling before going to the coiler.

With as much as 150 ft of looping for gravity cooling, the maximum production rate that could be expected was about 35 fpm. That was too slow. The 33 ft cooling tunnel gets the heat down while the strip whistles through at speeds up to 150 fpm.

Air Blast—Four 30 in. axial vane fans pour cool air into the tunnel at 40,000 cfm. One 48 in. fan pulls 57,000 cfm up the exhaust stack. The difference is air sucked in at either end of the tunnel, and heat sucked out of the steel.

Heat is vented up the stack. In cold weather, it can be used for heating the building simply by moving a damper.

Fans are so arranged that air is forced from both ends toward the center of the tunnel. The strip rides on the current of air, touching rollers only at entry and exit ports. Vanes inside create an air pattern which supports the strip without letting it scrape the top or bottom of the tunnel.

True Blue — Along with speed, the line picked up an unexpected dividend. By cutting back the tunnel furnace heat so that the strip emerges at 1100 instead of 1200°F, the strip acquired a new color. It comes out an intense deep blue instead of a dull blue-black. The rich, uniform color has sales appeal.

Most of the sheet is 30 gage. It comes off the line at about 120 fpm. The line is designed to blue from 32 to 16 gage with only minor adjustment.

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We call this perfect coordination of design and production "engineering experience *in action*." The result is efficient, practical, cost-saving equipment for your plant.

LEFT FOREGROUND — Conveyor table for rod or tube.

Hot Strip Mill Finishing train designed and built for Detroit Steel Corporation

Pittsburgh ENGINEERING & MACHINE CO.

Division of Pittsburgh Steel Foundry Corporation

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Try-it-yourself demonstration. Copperweld meltshop workers debate the merits of an electrode lifting device with the aid of a scale working model

Lesson in Electrodes

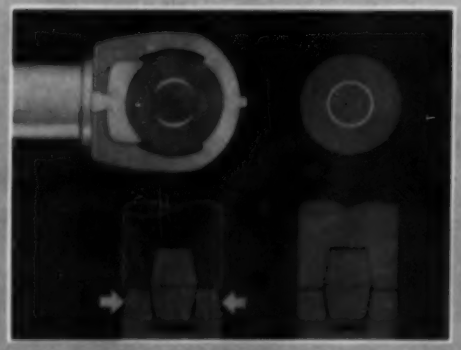
Melters go to a dinner-demonstration to learn how to get the most out of electric furnace electrodes. The payoff is better melt shop performance

"THIS session tonight was worth two years of training on the melting floor."

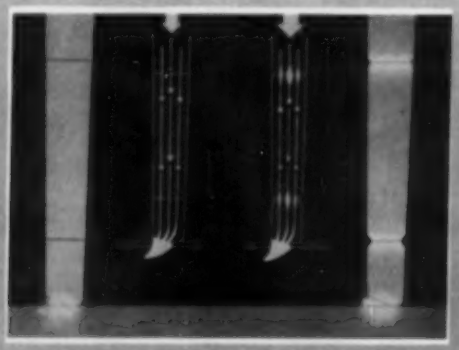
Such unsolicited comments (this one from a chief melter) make National Carbon Co. think it is on the right track with its shop training program on the care of electric furnace electrodes.

Questions and answers come thick and fast when National Carbon assembles a melt shop gang in a local restaurant. A good dinner comes first. Then the slide illustrated talk and demonstration begin, interspersed with frequent comments from the audience.

Questions — A second helper at Copperweld Steel Co., Warren, O. (where the photo above was taken), wanted to know what to do with the fiberboard caps used to protect the ends of electrodes in shipment. "That was a new one," says Bob Westlake, National Carbon's service engineer who puts on the demonstration. "It gave us a chance to remind the men to leave the



Clamping the socket area throws it out of round and leads to a loose joint



Eroded joints restrict current, causing heat buildup with further joint breakdown

KEEP AN EYE ON YOUR FURNACE SLIM-- THIS IS A SPECIAL HEAT!
THAT'S OK WITH ME DUKE IF YOU CAN FIX IT WITH THEM EXPERTS.
HOW CAN WE WATCH IT WHEN YA CAN'T EVEN GET CLOSE ENOUGH FOR A TEST?
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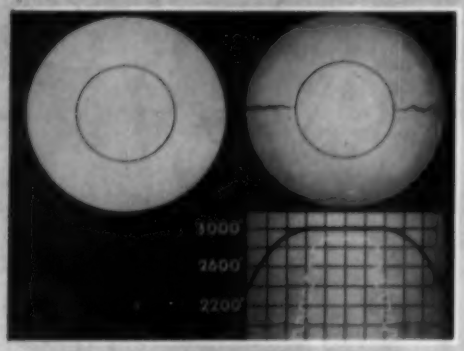
caps on until the electrodes are needed, and to pad the floor with them when they upend electrodes.

"These men want to talk, and we don't often get a chance to listen to them. They tell us what their troubles are; then we can do something to correct them."

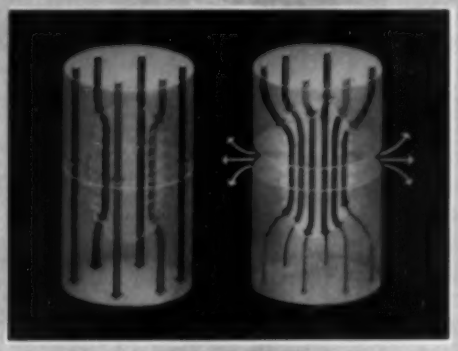
When the lights go out and slides come on, the comments keep right on coming. "We don't do it that way!" "You come on top our No. 2 furnace and try that. Well, maybe we give it a try." "That's how I broke two this morning. Nobody ever told me before I shouldn't clamp 'em that way!"

To Remember — For a quick rundown of some of the pointers that the sessions put across, see the "Electrode Tips" below. They are valuable, but National's audiences want proof. They get it in the form of a demonstration gadget which shows graphically why joints have to be tight. The men get a chance to try it, and see for themselves.

Do they remember anything? From management men, long after the meeting, come such comments as: "Stimulates discussion." "Practical." "We've noticed marked improvement in the way electrodes are handled." And from the shop side, a typical remark: "I've heard about the importance of clean joints for years, but I didn't believe it. Now I'm convinced."



Unequal cooling leads to cracked sockets if nipple clearance is not maintained



Loose joints waste current, put more current load on the connecting nipple

Electrode Tips for Electric Furnacemen

Precision Product—Graphite (and carbon) electrodes are turned, faced and threaded on precision machine tools. They're a precision product and rough handling can only do them harm

Keep Them Clean—Dirt in the threads makes a tight joint impossible. Keep protective coverings on electrodes and connecting pins or nippies until they are ready for use. Brush off and blow out sockets before making a joint

Money Talks—A 20 in. electrode costs as much as a good refrigerator. If you save 1 lb of electrodes per ton of steel, you may save your company $100,000 a year

Electrode Consumption—It occurs in the furnace in five ways: Sublimation, absorption, dipping, oxidation and breakage. You can't do much about the first two (which occur at the arc tip), but you can do plenty about the others

Dipping—It's the practice of adding carbon to the bath by washing it off the electrode at the arc tip. For every five points of carbon added by dipping, electrode consumption is increased 1 pound per ton. Changes in dipping practice can reduce this loss

High Temperatures—They aid oxidation, a big source of electrode weight loss. To reduce high temperature oxidation: Clean holders frequently, keeping them free of pits and high spots; maintain adequate clamping pressure; makes sure roof cooling rings are big enough, fit snugly and are kept clean. Holders and roof cooling rings need plenty of low temperature cooling water. Withdraw electrodes from the furnace during idle shifts and cover the roof ports with steel plates. Then the electrodes will cool quickly to a temperature at which oxidation is negligible

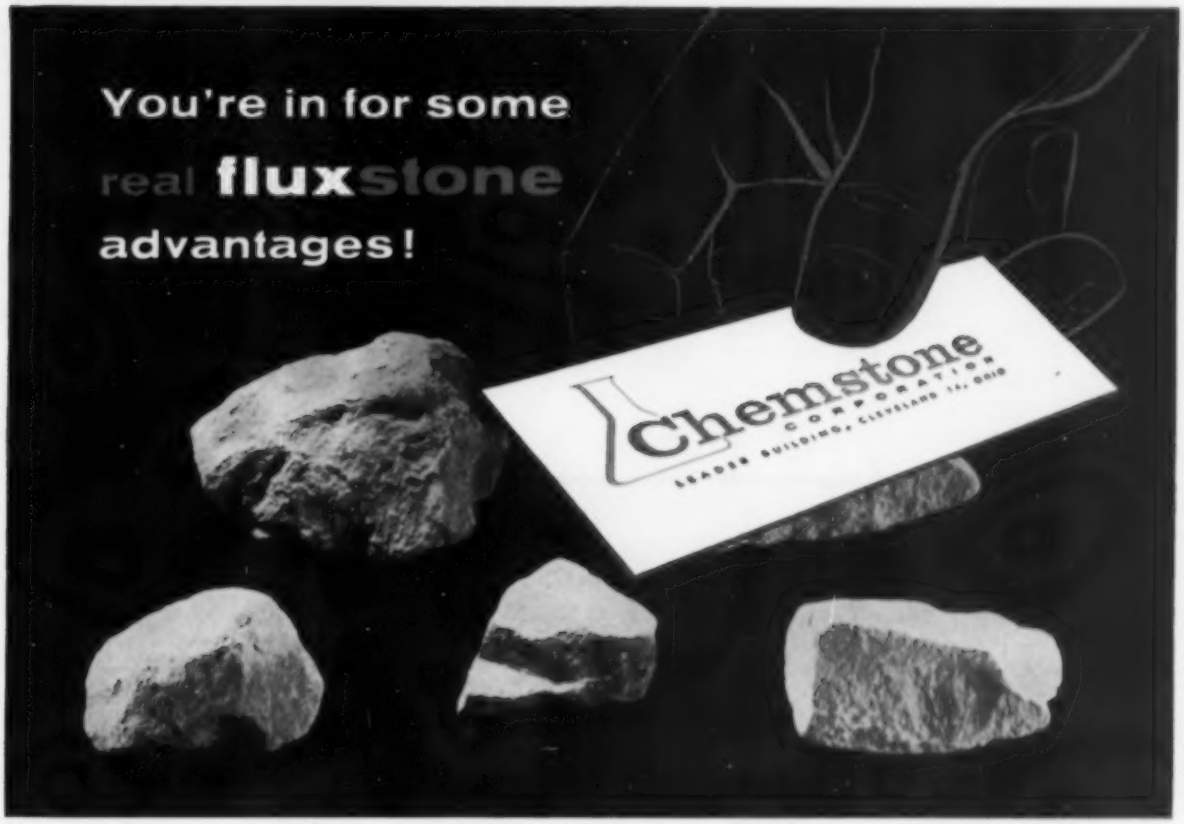
More Oxidation Causes—Excess air in the furnace causes electrode attack. Keep furnace openings—doors, tap holes, roof seats—tight. Electrode columns that are too long, too much ore or mill scale in the charge, dusty or dirty scrap, or dust collecting systems that aren't working right will add to your oxidation problem

Breakage—Too many electrodes get broken. Among reasons: Rough handling, jerky furnace tilting and roof swinging, excessive play in masts and gallows arms, uncentered cooling rings and ports, misaligned columns, poorly made joints, faulty scrap placement (heavy pieces should be placed low to prevent damage in scrap caves), chipped joints. Chipped joints oxidize and erode more rapidly than smooth surfaces. As nicks grow bigger, the reaction gets faster. Result: Wasping and a weak joint

Power Losses—It takes more power to push the current past a poorly made, open joint. In a poor joint, most of the current flows through the nipple, overloading it electrically, and power is lost in the form of heat. In a well-made joint, two-thirds of the current flow is through the electrode end faces, only one-third through the nipple or connecting pin. Tight joints save power

Clearance—National Carbon designs its connecting pins (nipples) to be run fully into one socket, then backed off one full turn before completing the connection. Backing off preserves thread clearance and distributes stresses equally

Watch the Clamps—Electrode sockets will deform under pressure. Always clamp below the socket when making joints. It is impossible to make a tight joint if the clamp is placed around the socket



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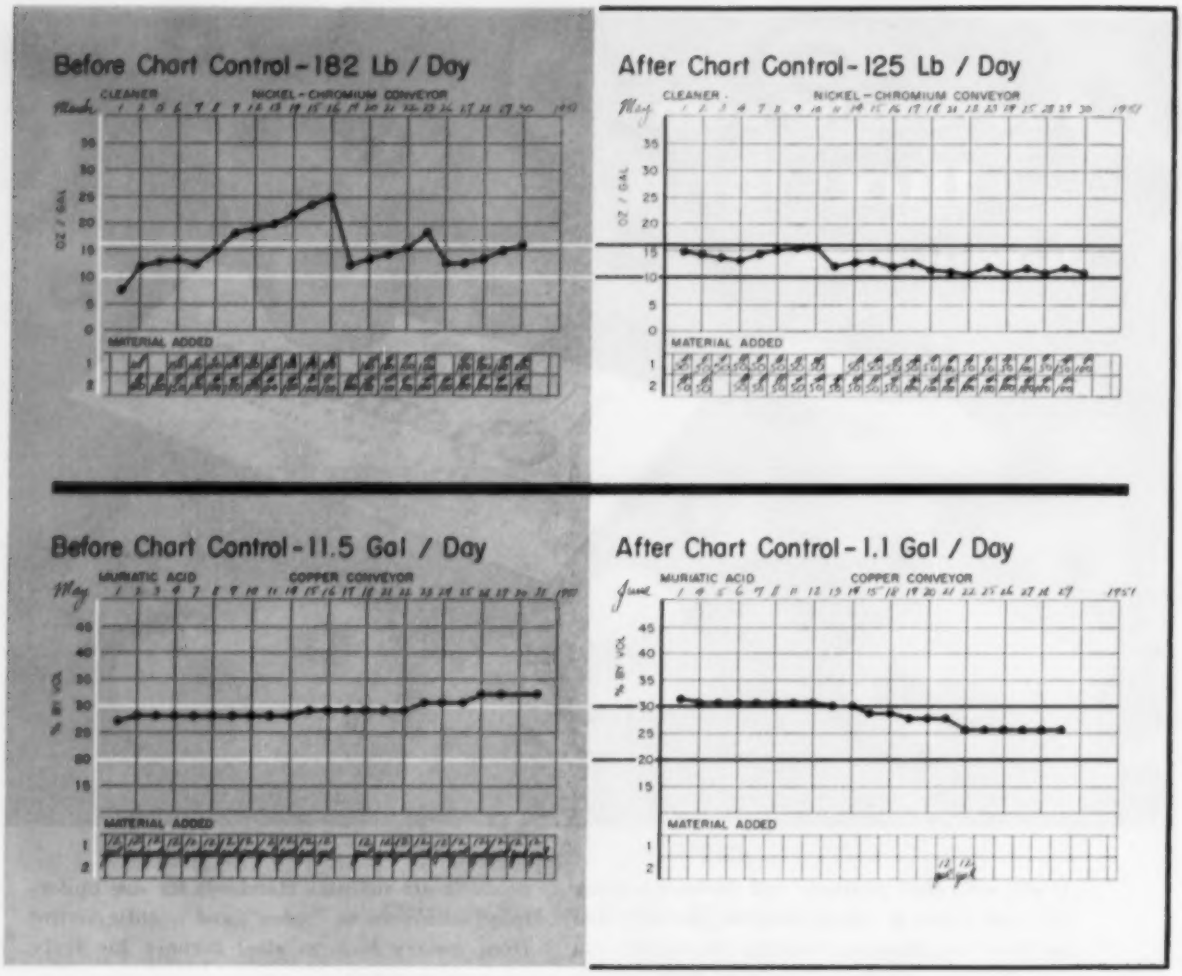

Quality Control Charts Plating Savings

By GUY J. CAMPBELL
Ternstedt Division
General Motors Corp.
Detroit

EFFECTIVE management of plating quality needs more than the familiar floor inspector. It calls for chart control, the first thing we installed when the statistical quality control department was organized at the Ternstedt Division, General Motors Corp., Detroit.

Immediate results: 60 per cent savings on sulphuric acid, 90 per cent savings on muriatic acid and 30 per cent savings on direct cleaner.

Breakdown — It pays to start simply and work toward the more complex problems. Our first installation of percentage-defective charts showed the defects at fabrication, bare metal finishing, copper plate and buffing and nickel-chrome plating. The types of defects were shown to aid in the corrective action. Rejects after plating were grouped this way:

1. Fabrication defects not detected previously.

2. Handling defects like scratches and nicks.

3. Defects caused by the plating process.

Another Problem—Closer control of the plating quality was the first objective. Floor inspectors were stationed at each plating conveyor. Corrective measures they initiated increased down time, and it was necessary to introduce closer controls.

Solution control solved much of the problem. We knew that weak cleaners, for example, didn't remove all the dirt and buffing compound.

Acids and metal solutions also

He's within an inch of his life...

but U. S. Matchless Steam Hose *kills all the risk*

Scalding steam—a roaring, raging demon hot enough to cause severe injury or death on contact—is tamed and controlled by U. S. Matchless® Steam Hose. After long, safe service (even with steam pressures up to 200 pounds) the wall structure, instead of bursting, allows a trickle of steam to merely *leak* through—acting as a safety valve and giving notice that it's finally time for a replacement. That's why plant safety councils everywhere firmly approve of the U. S. Matchless.

This great hose delivers long service. Despite its great strength, it is as flexible and easy to handle as cotton hose. It is used for steam lines in railroad yards and in roundhouses, steam pile drivers, steam supply lines from docks to oil barges, and steam lines in manufacturing plants. Other important uses are fire protection in oil refineries, thawing out tank cars, steaming out drums in chemical, soap and paper plants and paper mill black liquor recovery systems. U. S. Matchless Steam Hose is obtainable through any of the 28 "U. S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

had to be maintained within limits for thickness and adherence properties.

Daily tests of the acids and cleaners and weekly analyses of other solutions by the laboratory were on record. Charting these data showed that laboratory recommendations often were ignored. For instance, the cleaner concentration was consistently increased day after day even after analysis showed that it wasn't necessary. Often, chemicals were added to plating solutions to correct defects when the causes were unknown.

Education — The best way to eliminate haphazard methods is to acquaint all operators with their effects. Charts should be established for every solution and the specifications shown by red lines on the chart.

At Ternstedt, we used the specification limits as arbitrary upper and lower control points. Since plating solutions are homogeneous, only one sample is needed. Changes were made in the control limits when they were warranted.

Charts posted near the conveyor show solution strength and results of laboratory analyses to all concerned. With persistent questioning of every unnecessary addition (according to the charts), the solutions eventually were brought into control. Sequels: Improved plating, less materials used.

Racks—Another application that helped was the charting of defective plating racks. A floor inspector daily inspects a sample of 25 to 50 monorail racks. Treed plate, broken insulation, bent or broken retaining clips are causes for rejection. The display of the chart not only stimulated the rack repair department but indirectly was responsible for a better insulation coating.

Limits — Chart control won't solve all plating difficulties. The process is too complex, and outside factors, such as atmospheric temperature and barometric pressure, influence quality.

Use the basic principles of statistical control: Chart the information and exhibit it. We did, and it is still paying off.

A Switch in Equipment Buying

Depreciation is a real cost of doing business, not just a tax advantage, cautions a consulting engineer. He advises ignoring resale value until a change is pending

DOES YOUR present machine become "junk" the minute you start to figure on replacing it?

Taking issue with some of the well-established replacement techniques, B. A. Margo, consulting management engineer, St. Laurent, Que., says: "No."

"It seems to be accepted practice," he points out, "to assume that the existing machine is completely written off. Depreciation of the existing machine is not considered as a cost factor, a fact of considerable economical consequence for makers and users of equipment. Any contemplated new machine is immediately put at a disadvantage which, in numerous instances, might be sufficient to prevent its purchase." Depreciation is a real cost, recognized even by tax authorities.

Departure—Mr. Margo leaves accepted practice at the point where the "salvage value" of the present machine is brought in. (See STEEL, June 20, 1955, p. 120.) Usually, the resale value you'll lose by keeping the machine another year is counted as a cost of keeping the machine (therefore a cost of using it that year).

Not only is the resale value hard to predict, he feels, but it may well be the least important figure in the life of an asset.

Difference—While loss of resale value may be negligible, often is small, depreciation may be large enough to change the picture entirely. Mr. Margo uses this example to illustrate his point:

Assume we have a machine in operation, bought five years ago to give savings of $5000 a year during a service life of eight years. The price of the machine was $24,000. We figured a straight-line depreciation of $3000 a year.

After five years we are still saving $5000 a year and we are still figuring $3000 yearly depreciation.

First Step—Now when we consider replacing the machine, we first take the figures concerning our existing machine that are absolutely positive: The operating costs and the yearly depreciation.

"We have no reason whatsoever to say that our existing machine has suddenly a resale value only. It is still producing the anticipated savings and might continue doing this for many more years."

Second Step—Mr. Margo says it's not until the decision to buy the new machine has been made that the resale value comes into the picture. If the trade-in price or resale value is attractive enough, it may enable us to overlook the balance (in this case $9000 not written off) on the books.

"However, up to taking the second step, till we made up our minds to replace, we compared costs, using depreciation of our $24,000 machine as one of the cost figures of importance.

"This depreciation is a figure of our present operation, it is real and would continue being real if we decided to keep our machine in operation."

Equipment Reserves

Mr. Margo's philosophy would have one additional advantage for the plants using it. It would point up depreciation as a real cost of using the equipment, not just a tax advantage.

Too often, experts feel, the tax benefits are used wisely, but there is no allocating of proper funds to make up depreciated equipment when the time comes. As a result, some companies are in dire need of better equipment and lack the money to get it.

Brush wire, crimped (as shown) or straight, now produced in multiple strand, and furnished in coils or straight hanks depending on wire size.

How a **new idea in wire** *cleaned up a brush production problem*

● Maybe you can profit by the kind of interest and action applied to customers' problems by the Worcester Wire Works Division of National-Standard. Take wire brush manufacture for example . . .

Until recently, brush manufacturers had to cut through a coil of wire, then gather by hand and by guesswork the approximate number of wires for the type of brush in production. Naturally this involved a lot of cut-off waste, plus the wire lost through faulty guesswork.

Now, to overcome this waste, Worcester Wire Works has developed ways to produce and furnish wire in predetermined bunches (up to 400 wires per bunch) with *exactly* the right number of wires for a given brush. Much costly loss is eliminated, more brushes are produced per pound of wire, and production is speeded.

The point is, Worcester Wire Works people specialize in more than quality wire. They also specialize in the kind of service and exploration that time and again cuts costs for customers. Better check with them on your wire needs. You'll like the way they do business.

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WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
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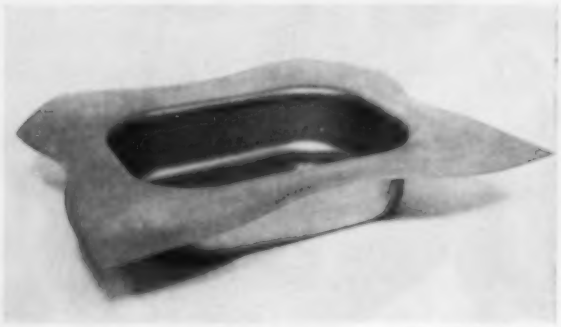
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

Star Tool & Die Works

Fig. 1—Tractor seat drawn from 14 gage (0.077-in.) steel. Note draw beads on two sides



Active Industries Inc.

Fig. 2—Kitchen sink drawn from 16 gage (0.061-in.) enameling iron

SUCCESS OUT OF FAILURE—PART III

Lubrication in Drawing

By EUGENE D. VIERS
President
Kondor Products Corp.
Cleveland

THE JOB of a drawing lubricant is to prevent metal to metal contact. It must work under conditions of severe pressure and heat; requirements are stiff.

The ten essentials of a drawing lubricant are listed on this and the opposite page, in order of importance. They sum up Parts I and II of this article (July 9 and 16).

Tractor Seat — Many failures have been made successes with the correct lubricants. In drawing (one operation) a tractor seat from 14 gage (0.077 in.), hot-rolled, pickled sheet, the metal wrinkled excessively.

Fig. 1 shows the tractor seat drawn free of wrinkles. Note the two grooves; single pressure pads were used on two sides of the blank.

Porcelain—In the production of a kitchen sink, drawn from 16 gage (0.061 in.), enameling iron, one of the most progressive manufacturers in the pressed metal industry was experiencing a common type of difficulty which increased his cost per piece excessively.

Wrinkling of the flange surface at the back of the sink, where the faucets are assembled, and buckling of the front and sides resulted in costly metal finishing (polishing) before porcelain enameling.

Solution—Figs. 2 and 3 show the the result of using the correct drawing lubricant, taking into consideration that these sinks were to be porcelain enameled. Note the absence of wrinkling and buckling on the top surfaces, as well as the absence of scarfing, scratching or galling on the bottom.

This surface is unimportant in the finished product, since it is hidden from view after it is in-

Ten Essentials of a Drawing Lubricant

FILM STRENGTH The ability of a material or compound to prevent two metal surfaces from coming into contact with each other under compressive sliding forces is called film strength. Since pickup, which results in scratching, scarfing, etc., is the most important difficulty to overcome and is directly due to metal to metal contact, film strength becomes the most important property a drawing lubricant should possess.

HEAT RESISTANCE The performance of a lubricant is greatly affected by operating temperatures resulting from severity of draw and speed of operation.

ANTIWELDING Antiwelding properties are important in eliminating metal seizure, either from metal to metal contact of the work and dies or from particles of metal being carried onto the die.

NONCORROSIVE The drawing lubricant designed for the particular operation should neither oxidize nor corrode the work or the tool or dies. Rather, it should contain water soluble inhibitors to prevent rusting of metals, since for the most part, water is used to extend drawing lubricants for application.

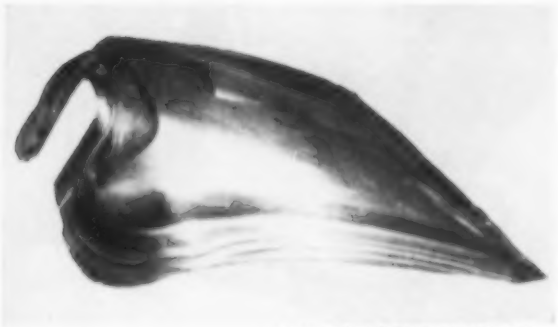
STABILITY A drawing lubricant should remain permanently stable, both mechanically and chemically. It should be permanently stable as received, and should not separate on standing for short periods after dilution with water. It should not become rancid, either in the concentrated or the diluted form. There should be no agglomeration of colloidal suspension ingredients or other ingredients present or added.

APPLICATION A drawing lubricant should be adaptable to any practical method of application.

REMOVAL After the panel or part has come off the press successfully formed, the drawing lubricant should completely volatilize or evaporate off the surface of the part. Unfortunately, this is impossible. However, it should

Active Industries Inc.

Fig. 3—Another view of part in Fig. 2. Bottom is free from scarfing, wrinkling or buckling



Congress Tool & Die Division, Tann Corp.

Fig. 4—Hood top drawn from 19 gage (0.042-in.) steel blank 82 x 66 in.

stalled. However, if pickup did exist on the draw ring, it would have resulted in a condition which would require constant honing and stoning of the dies with attendant down time and loss of valuable production. The cleaning procedure on these sinks includes a mild alkaline wash through a conveyor washer, followed by a water rinse.

Auto Stamping — Automotive stylists and designers, aware of the importance of maintaining position or keeping ahead of the "modern trend," often design a new model with certain panels or sections which are difficult to form. Frequently, they may approach the impossible.

In the recent development of a new model, the design of one part called for certain contours and uneven depths. It required strategically placed double beading and a locking bead at the inverted U-shaped front end to increase the mechanical resistance of the blank holder.

The part was to be drawn from 19 gage (0.042-in.) steel, with a blank 82 x 66 in. wide. Fig. 4 illustrates the successfully drawn hood top.

Note that the metal in the area of the "U" cannot move across the ring because of the locking bead. This is a severe test for the drawing lubricant, since the steel has to flow from the other three directions to make the draw.

Stainless Steel—In the single draw forming of an automatic water cooler top from 302 stainless steel 0.035-in. thick, the manufacturer was having difficulty with scoring at the corners. The top (Fig. 5) has two difficult style designs. The blank is 18¾ x 20 in. The part is drawn with draw beads on the blank holder and requires a lubricant with extremely high load bearing characteristics, as well as excellent slip or lubricity.

Sparkling Finish—Fig. 6 shows the finished top. Note the absence of wrinkling or buckling, as well as scratching and scarfing, which were prevalent when using ordinary compounds.

Stainless steel, more for utility than decoration, is dressing up one of the most common items in the world—the service station gasoline pump. The initial installation is to be made in California, to eliminate replacement brought about by the corrosive attack of the salt sea air.

Washboarding—In the tryout of dies for the pump domes, the manufacturer found it difficult to hold the square blank sufficiently to prevent "washboarding" over the draw ring. Fig. 7 shows the part after the first operation (draw).

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neither dry nor contain materials that would oxidize or polymerize, making it difficult to remove with commercial cleaning methods. Consideration for subsequent operations, such as another draw, an anneal, polishing, painting, enameling or plating, should be of prime importance.

PHYSIOLOGICAL AND PSYCHOLOGICAL Perhaps as important as any other consideration is the effect on workmen. A drawing lubricant should not cause dermatitis or skin infection, even after standing for long periods in diluted form. The lubricant should be as nearly neutral as possible, giving off no obnoxious or unpleasant odors. Perfumes or masking agents should be avoided, since they merely tend to cover rancidity rather than prevent it.

The drawing lubricant should not be disagreeable to handle or difficult to wash from the hands. For example, graphite, although disagreeable for workmen to use, is harmless. White lead, which has particularly high load-bearing characteristics, causes lead poisoning.

MULTIPLE APPLICATION Most metal stamping plants are required to fabricate a variety of materials, designs and gages. The fewer drawing lubricants to keep track of the better. A drawing lubricant should be as versatile as possible.

COST The price of a drawing lubricant although an important factor in selecting the correct material to facilitate the forming of metals, is by no means the first consideration. It should be the last. Often, too much emphasis is placed on initial cost. This results in the purchase of inferior materials, causing additional operations and additional applications of lubricant. These materials also result in excessive scarfing which increases down time. Expensive die men have to hone and stone dies. These costs are further extended to expensive metal finishing labor.

Cost includes all phases of the operation. It is false economy to purchase the lowest priced compound, based on preconceived ideas regarding requirements. Price alone is not the criterion of true merit.

Star Tool & Die Works

Fig. 5—Automatic water cooler top drawn from 18¾ x 20 in., stainless steel blank, 0.035-in. thick

Star Tool & Die Works

Fig. 6—Stainless steel water cooler top ready for assembly. Note absence of wrinkling, scratching and scarfing

Geometric Stamping Co.

Fig. 7—Dome for gasoline service pump drawn from 0.035-in. stainless. Note absence of draw beads

Geometric Stamping Co.

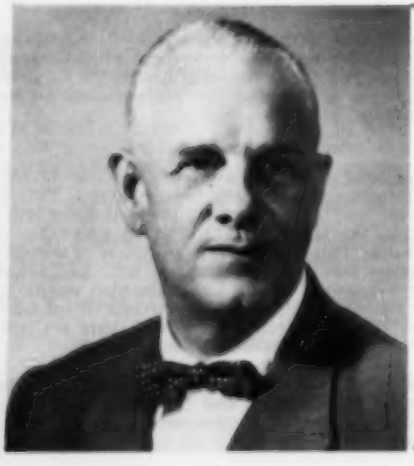
Fig. 8—Dome for gasoline service pump with flange trimmed in final operation

following the application of a new lubricant.

Although the dome uses the same gage stainless and has about the same dimensions and depth of draw as the water cooler top shown in Fig. 5, it is drawn successfully without draw beads. It depends entirely on the properties of the lubricant to prevent wrinkling and buckling, and its attendant breakage. Fig. 8 shows the final operation.

Heavy Gages—A lubricant developed for a certain type of draw or gage of material might be entirely unsatisfactory for other or heavier gages. Such was the case when one of our drawing lubricants had been successfully operating on many different shapes and sizes throughout the plant.

In the development of a torque converter, the cup for the front



MEET THE AUTHOR

Eugene D. Viers has a background rich in chemistry and metallurgy. His first position was analytical chemist with Hughes-Guentzler Laboratories, Cleveland (now Crowell & Murray Inc.). He served as metallographist and research metallurgist at Thompson Products Inc., Cleveland, for nine years. Other positions: Chemist and assistant metallurgist at Wilcox-Rich Corp., Battle Creek, Mich.; electroplating chemist at Eaton Mfg. Co., Cleveland; and chief metallurgist at Cleveland Welding Co., Cleveland. He started Kondor Products Corp. in 1937 to manufacture drawing lubricants.

How vapor degreasing with Triclene® D improved metal cleaning in three plants

"No etching of aluminum parts with 'Triclene' D in the degreaser"—*Plumbing Accessories Mfgr.*

"We no longer have to add stabilizers since we have been using 'Triclene' D trichlorethylene. What's more, we've been able to increase the time between degreaser cleanouts from every 3 or 4 days to 2 weeks!

"With the degreaser solvent we formerly used, the frequent development of acid solvent caused a high number of rejects due to etching and staining of highly polished aluminum parts. Since changing to 'Triclene' D, we've noticed a big reduction in the number of rejects, and we have no solvent control problem. This means real savings in production and maintenance."

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"We operate six degreasers—two manual and four conveyorized—and turn out as many as 150,000 parts a day. We can't *afford* to have trouble. That's why we use 'Triclene' D trichlorethylene.

"This rugged solvent gives us trouble-free degreasing of the automotive stampings we manufacture. With 'Triclene' D, work volume has increased . . . maintenance costs have decreased. And we've never found a degreasing job 'Triclene' D couldn't do!"

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"When we changed to 'Triclene' D, we substantially cut our degreasing time. *In a single operation* we now get the thorough, safe degreasing we need. Furthermore, adjustment of solvent pH is no longer necessary, and our time between cleanouts has been extended to six or eight weeks instead of the two we used to get!"

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Fig. 9—Torque converter covers drawn from 7 gage steel. Cup B is the 75th and C is the 200th cup drawn after changing lubricants

cover was designed from 7 gage (0.180-in.) steel, making the particular lubricant inadequate or inferior to this gage material. Cups coming off the press were hot and severely galled.

New Lubricant—In Fig. 9, cup A shows excessive galling, the result of inferior lubrication. Cup B is the 75th piece following the application of the new lubricant, showing the certain but gradual reduction of pickup. Cup C, the 200th piece coming off the press, shows the complete removal of pickup, resulting in a mirror finish.

Industry is forming parts by the draw press method that only a short time ago were thought impossible to produce by hot forging.

Example—The part in Fig. 10 was cold formed from 7 gage steel. It is 9 in. in diameter and 5 in. deep. Note the absence of scoring, not only on the excessively tapered surface of this part but also in the deep serrations drawn into the surface. Fig. 11 illustrates a difficult design drawn from 7 gage, hot rolled, picked steel.

Motor Domes—In many domestic appliances, the operating electric motor is totally enclosed in a housing or dome. Fig. 12 illustrates one drawn from 7 gage, hot-rolled, pickled steel.

Here, also is the result of applying the correct lubricant. This is an offcenter draw.

Big Problem — Lubricants are absolutely necessary in forming sheet and plate metal into desired shapes and products. Lubricants are essential in the cold reduction of seamless metal tubing, as well as in all extrusion operations.

The big problem is always the selection of lubricant for the operation. No single lubricant or process can be universally applied to all metal forming operations.

No Cure-All — Example: The phosphate process as a pretreatment to the application of lubricant is desirable for the cold reduction of tubing and extrusion of metal, but unnecessary for other types of operations.

Dry coat drawing lubricant has a definite but specific place in metal forming, but should not be considered as an all-purpose medium.

Others — Drawing compounds containing solid lubricants are referred to in industry as pigmented materials, and are generally excluded from all porcelain enameling operations because of the difficulty in removing them before enameling.

If intelligence is exercised in the selection of materials for this use, and co-operation exists between the pressroom and the enameler, great improvement can be expected in metal forming operations prior to porcelain enameling.

Application—There seems to be no practical way of automatically applying lubricant to every operation. But die automation to apply the correctly selected lubricant to punches, dies or blank holders should be seriously considered in those operations where the success or failure of one part depends on the operator.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Geometric Stamping Co.

Fig. 10—Part drawn from 7 gage, hot-rolled steel. It is 9 in. in diameter and 5 in. deep. Note absence of scarfing in deep serrations on tapered surface

Fig. 11—Unusually difficult part drawn from 7 gage, hot-rolled steel

Geometric Stamping Co.

Fig. 12—Motor dome drawn from 7 gage, hot-rolled, pickled steel. Note offcenter draw

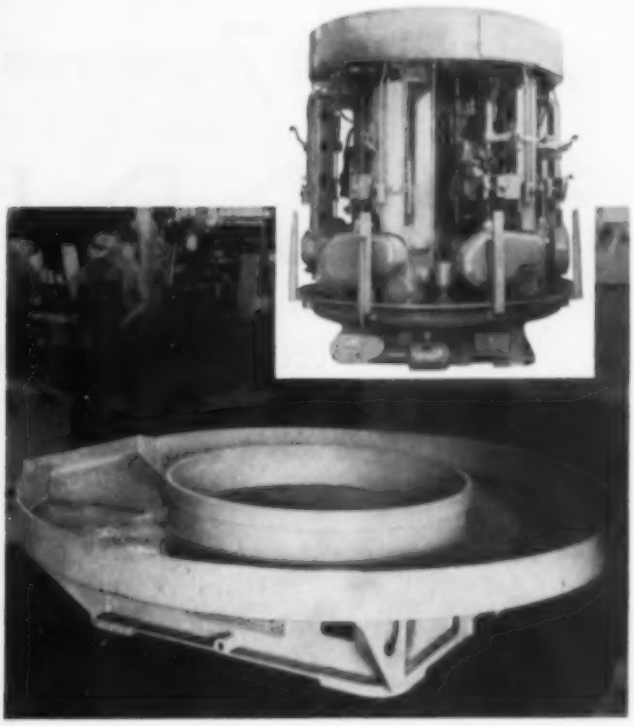
When a product design can be simplified...

Has greater strength... higher rigidity...

Yet takes less material... costs less to produce...

WHY use anything but welded steel

All welded base *for multiple spindle hobbing machine. Photos courtesy The Lees Bradner Company, Cleveland, O.*



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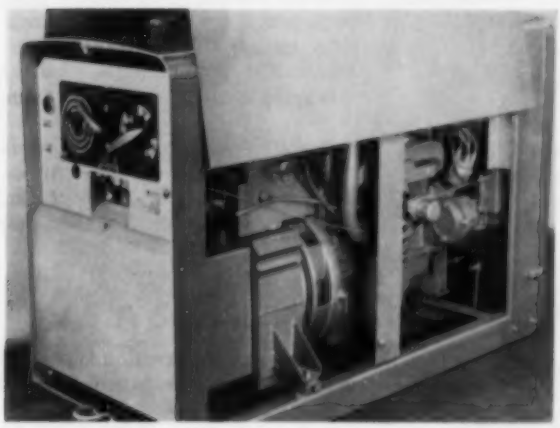

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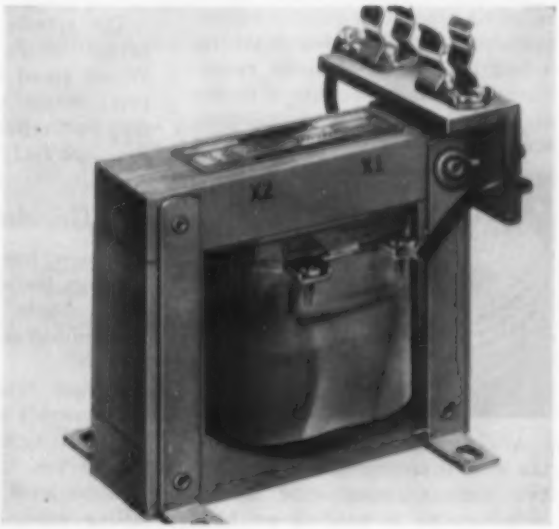

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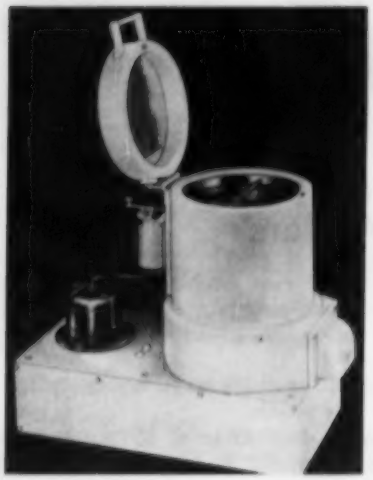

The dryer may be electrically heated; the heating element is in the cover. The turntable has a suction fan to draw air down through the work. *Write*: Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J. *Phone*: Matawan 1-1000

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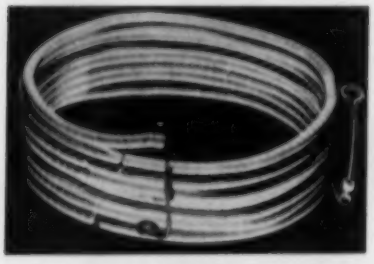
The electrical resistance heating element makes preheating or stress relieving pipe welds quicker, easier, more precise. The Heat-O-Coil is a length of small diameter resistance wire. Except for several inches at each end, ceramic ball-and-socket beads are strung on it.



After wrapping the coil around the welded section of the pipe, the two ends are connected to the terminals on a welding machine. Thermocouples are inserted under the coil, and the section is wrapped with an asbestos covering. The welding generator is adjusted to hold the correct temperature.

For large diameter pipe, 25 ft of ⅛-in. coil is used; for small diameter pipe, 10 ft of 1/16-in. coil. *Write*: Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa. *Phone*: Saratoga 7-1500

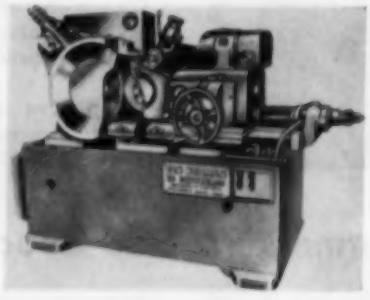
Motor Drives

A new line of fractional horsepower drives uses printed circuits. Included are both full-wave and half-wave units in a range from 1/50 to ¾-hp.

A rectifier furnishes direct current to the drive motor. Speed control is precise; torque is constant over the entire speed range. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Centerless Grinder

The 2C grinder does through-feed and infeed jobs. It forms, grinds and does profile work; it's equipped with a crush dressing attachment.



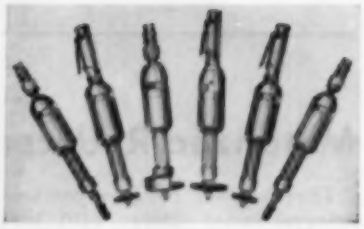
The spindle needs no warm-up period. Work can be up to 4¾-in. Wheel speed range is 10 to 355 rpm. *Write*: Van Norman Machine Co., Springfield 7, Mass. *Phone*: Republic 7-4721

Die Grinders

A new line of heavy duty die grinders features increased power, larger blade area, longer rotors, streamlined contours and quiet operation.

Models range from 3-in. units that operate at 12,000 rpm to ¼-in. collet-type tools that run at 20,000 rpm.

Noise level is kept low by channeling exhaust air through more



than 100 milled, gear-like slots around the circumference of the motor housing.

Escaping air is diverted from the work and the operator's hands by a thin-walled steel deflector shell which can be rotated 360 degrees. *Write*: Master Pneumatic Tool Co. Inc., Krick Rd., Bedford, O. *Phone*: Bedford 2-1300

Strap Cutting

Model E-5600 is an electric power dispenser for cutting steel strapping to specified lengths. Rate: About 250 ft a minute. Range: Strapping sizes from ¾ x 0.028-in. to 2 x 0.050-in.

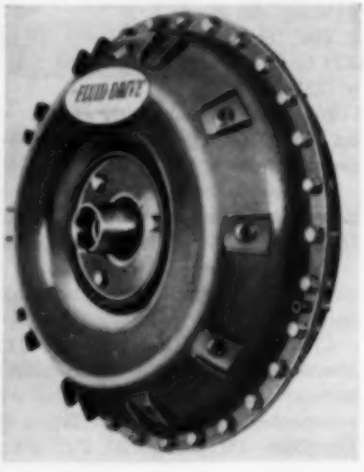
The electric motor which powers the unit has a magnetic brake. *Write*: Allegheny Steel Band Co., Box 716, Pittsburgh 30, Pa. *Phone*: Walnut 1-7100

Fluid Drive

The Gyrol is a traction type fluid drive for electric motors or internal combustion engines.

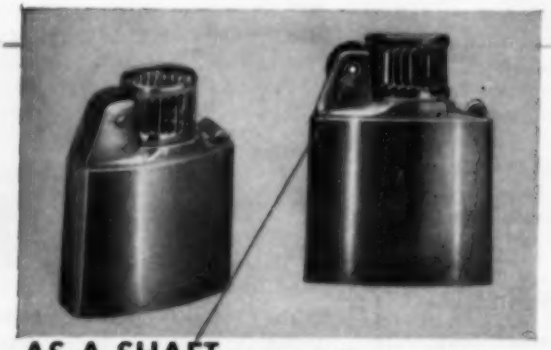
Its power rating is 25 to 85 hp for material handling vehicles, depending upon the drive speed.

A flexible coupling half on each end of the fluid drive modifies the unit for constant speed electric motor applications—driving pro-



Three typical Rollpin cost reductions

AS A RIVET Rollpin cuts material and assembly costs 25% on Reynolds Gas Regulator Co.'s toggle lever assembly.



AS A SHAFT before and after shot of this Ronson lighter shows how Rollpin made savings of 1½¢ per unit in assembly of spark wheel.

REPLACING A TAPER PIN Rollpin saves 24¢ labor cost on each of American Machine and Foundry's MITY-7-VISES. Eliminates tool cost caused by breakage of small taper reamers.

ESNA®

ROLLPIN TRADEMARK

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws—or straight, knurled, tapered or cotter type pins—Rollpin can cut your production and maintenance costs as it does in every class of industry. Rollpin is a slotted tubular steel pin with chamfered ends that drives easily into standard holes, compressing as driven. Its spring action locks it in place—withstanding impact loading, stress reversals and severe vibration. No threading, peening or precision drilling needed. Rollpin is readily removable and can be re-used in the same hole.

ELASTIC STOP NUT CORPORATION OF AMERICA

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R38-760, 2330 Vauxhall Road, Union, N. J.

Please send the following fastener information:

☐ Rollpin samples
☐ Rollpin bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

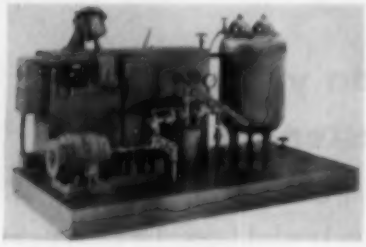
Street_____ Zone____ State_____

duction and processing equipment, machine tools, conveyors and other material handling installations. As a motor driven unit, the fluid drive is rated at 7½ to 15 hp for 1200 rpm drive speed and at 25 to 50 hp for 1800 rpm. Outside diameter of the unit is 14 15/16-in. *Write*: American Blower Corp., Detroit 32, Mich. *Phone*: Trinity 2-4300

Casting Impregnator

The high pressure unit seals porous castings with a metallic sealant. No vacuum cycle is needed.

It is built on a single platform covering 21 sq ft of floor space and can be moved easily.



Gas, steam or electricity is used for heating. The impregnator operates on 220 or 440 volts, ac. *Write*: Tincher Products Co., 2023 S. 60th St., Milwaukee 14, Wis. *Phone*: Evergreen 4-1797

Zinc Oxide

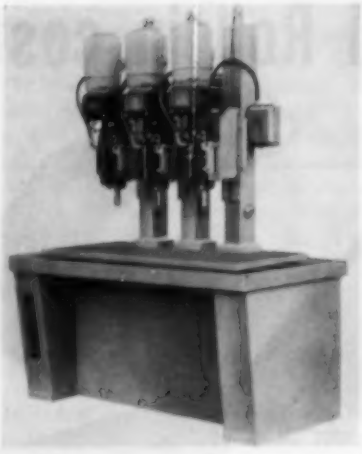
Azodox is a lead-free zinc oxide with a high apparent density. It mixes, incorporates and disperses quickly in paint vehicles.

The material flows freely and reduces dusting. *Write*: American Zinc Sales Co., Columbus, O. *Phone*: Axminster 9-4101

Automatic Drill Press

High production drilling, tapping and other machining operations normally performed with drill press equipment are done by this standard machine. It incorporates one or more Model 24 Holomatic drill units, a steel weldment base with vertical columns and power and cycle control systems.

The Holomatic unit is a tool feeding device which uses air line pressures for thrust and a hydraulic system for spindle travel control. Depths can be held to 0.0005-in. Spindle speeds from 190 to 10,000 rpm are developed.



A wide chip and coolant collection area is incorporated into the base. The 44-in. high vertical columns allow spindles to be adjusted from the table top to 26 in. above the table.

Up to four tool feeding devices are mounted in line on standard presses. *Write*: Hause Engineering, Montpelier, O. *Phone*: 5-3158

Automatic Ladling

This unit provides fully automatic processing for many types of aluminum castings (especially die and permanent mold).

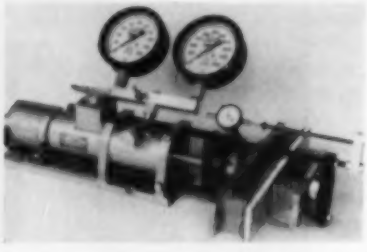
Special refractory materials are arranged so that the molten metal being ladled cannot come in contact with any metal structure. The basic pump has no moving parts, check valves or other devices.

The unit operates on the principle of a pressurized chamber. Size of the shot depends on the time and amount of pressure. Metal is withdrawn underneath the surface of the bath.

Accurate control of the shot (usually 1 to 10 lb) is provided without interruption during the charging of metal. *Write*: Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill. *Phone*: Monroe 6-3443

Honeycomb Testing

When used with the Cal-Tester machine, the flexural fixture permits tension, compression and flexure testing of honeycomb and plastic materials. The machine provides a constant rate of strain and load.



The tester comes in 200 to 10,000 lb capacities. *Write*: Pacific Scientific Co., 6280 Chalet Dr., Bell Gardens, Calif.

Gage and Die Steels

Vulground flat ground gage and die steels come in oil and air hardening types. The steels are precision ground to a high microfinish. They come in 18 and 36 in. lengths in a wide range of standard thicknesses and widths. *Write*: Vulcan Crucible Steel Division, H. K. Porter Company Inc., 330 Minton St., Aliquippa, Pa. *Phone*: Essex 5-6621

Dynamic Balancing

The Series 500 machine can handle such parts as armatures, rotors and mill rolls that weigh 5 to 10,000 lb.

A true, seismic, free-in-space unbalance indicator is attached to work supporting mountings on chrome balls and raceways which provide over 4 in. of free amplitude travel. Large amounts of unbal-

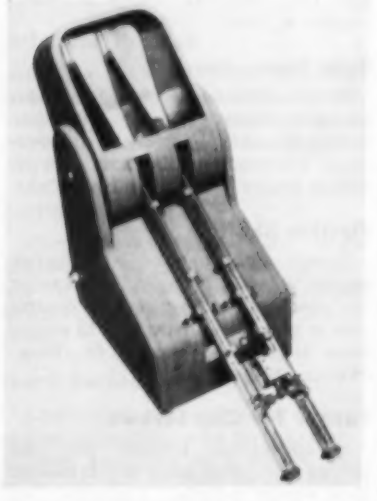
ance can be corrected at low, safe speeds because of the wide range of the variable speed power drive.

Maximum swing diameter of the workpiece is 48 in. Maximum length is 35 ft. *Write*: Raydyne Corp., 920 W. Laurel St., Springfield, Ill. *Phone*: 2-9122

Feeder For Small Parts

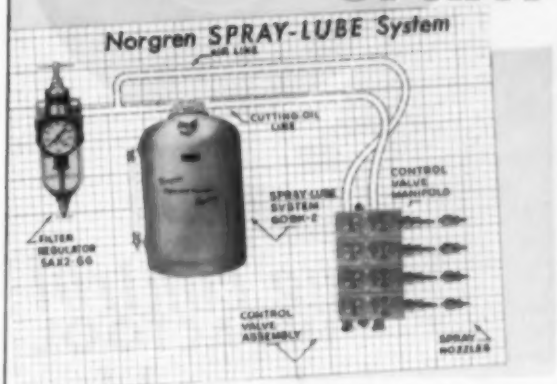
Hopperal uses a sliding action hopper feeder.

The automatic feeder selectively arranges bolts, nuts, screws, nails, rivets and other small parts on an internal track, permitting them to file out in an orderly manner to



the outside feed rack and down to any required position. A selector gate rejects pieces not positioned properly. *Write*: Haberstump-Harris Inc., 10463 Northlawn Ave., Detroit 4, Mich. *Phone*: Webster 3-1221

Faster Metal Cutting at LOWER COST with improved Norgren SPRAY-LUBE

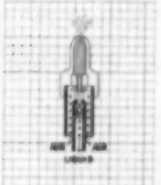


for
Tapping Machines
Drill Presses
Milling Machines
Grinders
Lathes
Boring Machines
High-Speed Saws
Stamping Presses
Die Lubrication
Other Metal Working Equipment

Better Lubrication—A better, more uniform spray of cutting oil is applied directly upon the close interface between the tool and work piece. It can be directed from the underside of the curled chip or from any other angle that will best reach the critical lubrication points. Tool wear is less—saves tool costs, cuts down-time.

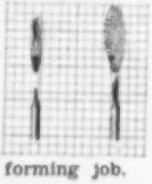
Faster Cooling—Because of the larger fluid surface area of the spray and the expansion of the compressed air, heat is dissipated quicker. Cutting can be faster—production stepped up.

Uniform Spray



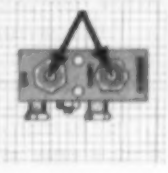
Air and cutting oil, with flow of each accurately controlled, are conveyed to the nozzle by means of a tube within a tube connection. The oil spray produced by the discnarge nozzle is consistently uniform in quality. The spray is delivered to the cutting area the instant the machine is turned on. There is no sputtering or intermittent flow.

Accurate Control of Spray



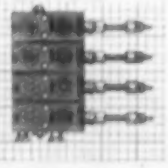
By adjusting the pressure and the individual outlet controls for air and coolant, spray can be applied in exactly the right quality and quantity for any metal cutting or metal forming job.

Tamper-Proof Controls



Allen-head screws are used on the control valves for adjusting flow of both air and liquid and are recessed into valve to prevent tampering with flow.

Valves Compactly Manifolded



For multi-point application of SPRAY-LUBE, the control valves are designed so that they can be closely assembled in a manifold arrangement.

Compact, Convenient Size

A space only 14"x20"x7" is required for a 2-gallon unit—4 to 12 fluid ounces of liquid an hour per nozzle are sufficient for most operations.

Norgren CA CO
3412 So. Elati St., Englewood, Colo

Without obligation, learn how improved Norgren SPRAY-LUBE can reduce costs in your plant. Call your nearby Norgren Representative listed in your telephone directory — or WRITE THE FACTORY FOR BULLETIN 537.

Pioneer and Leader in Oil-Fog Lubrication Since 1930

3K

Have you seen what this CAN DO FOR YOU?

Torque control IMPACTOOL

NEW accuracy and speed for precision nut running jobs . . .

- **POSITIVE TORQUE CONTROL**—a revolutionary use of a rugged steel torsion bar for precision control of torque—combined with the power and speed of the Impactool.
- **SIMPLE TORQUE SETTING**—torsion bar adjusting sleeve is clearly calibrated for changing torque with easy-to-use torque jig.
- **TORQUE SETTING REMAINS CONSTANT**—for any nut running condition until the adjustment is changed.
- **ELIMINATES "OVER-TORQUE"**—impact mechanism rebounds instantly when preset torque is reached, tripping a foolproof rubber faced shutoff valve.
- **LOW MAINTENANCE**—combines many of the proven features of Ingersoll-Rand Impactools, with their enviable record of dependable performance and low maintenance.
- **REVERSIBLE**—full power in either direction.
- **NO CLUTCH**—to wear, slip or require adjustments.

Get a free demonstration of Ingersoll-Rand Torque Control Impactools by an I-R AIR engineer now... or write for additional information

2 TORSION BARS PROVIDE MULTIPLE TORQUE SETTINGS

- No. L735 Max. torque 60 ft. lbs.
- No. H735 Max. torque 90 ft. lbs.

For torques up to 550 ft. lbs. a Size 5340T Torque Control Impactool is available.

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

8-342

NEW Literature

Write directly to the company for a copy

Box Testing

Bulletin 11, 24 pages, tells how to test corrugated boxes. Hinde & Dauch Paper Co., Sandusky, O.

Gearmotors

Advantages of ⅛ to 30 hp gearmotors are discussed in a 16-page bulletin, 1880. U. S. Electrical Motors Inc., P. O. Box 2058, Los Angeles 54, Calif.

Marking Machines

Technical information on metal marking and marking machines is given in a 36-page catalog. Noble & Westbrook Mfg. Co., Westbrook St., East Hartford 8, Conn.

Speed Shear

A 4-page bulletin describes a 24-in. power shear. Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, O.

Metallic Abrasives

Catalog 556, 18 pages, presents technical data on various types of shot and grit. Cleveland Metal Abrasive Co., 800 E. 67th St., Cleveland, O.

Fluid Power

Bulletin 44200-A, 12 pages, describes fluid power units designed to simplify application, provide precision feeds and high traverse speeds. Oilgear Co., 1593C W. Pierce St., Milwaukee 4, Wis.

Data Processing

Bulletin 3003A, 8 pages, depicts an analog-to-digital converter and other data processing equipment. Consolidated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Calif.

Flexible Shafting

Design information on flexible shafts from ⅛ to 1⅝-in. in diameter for power drive and remote control uses is given in bulletin 570, 12 pages. Stow Mfg. Co., 443 State St., Binghamton, N. Y.

Torque for Cap Screws

Recommended torques for cap screws and place bolts are tabulated in a 4-page bulletin. Cleveland Cap Screw Co., Box 579, 2917 E. 79th St., Cleveland 4, O.

Cast Iron Specifications

Commonly used specifications for gray and nodular cast iron and a summary of specifications for cast pressure pipe, soil pipe, valves and

fittings are given in a 4-page folder. Gray Iron Founders' Society Inc., 930 National City-East Sixth Bldg., Cleveland 14, O.

Process Heating

Techniques used in heating and conveyor systems, including a method of combining radiation with convection, are presented in a 16-page bulletin. Jensen Specialties Inc., 9331 Freeland Ave., Detroit 28, Mich.

Beryllium Copper

Bulletin A-300, 4 pages, details methods for heat treating beryllium copper. American Silver Co., 36-07 Prince St., Flushing 54, N. Y.

Pallet Containers

A 12-page catalog illustrates uses of steel mesh containers for storing parts and equipment. Materials Handling Equipment Division, Union Steel Products Co., Albion, Mich.

Nonferrous Annealing

A 6-page bulletin describes a high convection annealing system. Lee Wilson Engineering Co. Inc., 20005 W. Lake Rd., Cleveland, O.

Propeller Fans

Specifications and performance data on a line of propeller fans are presented in bulletin A-109B, 40 pages. Hartzell Propeller Fan Co., Piqua, O.

Extrusion Presses

Bulletin 14.17, 8 pages, describes a line of presses for extruding ferrous and nonferrous metals. Lake Erie Engineering Corp., Box 68, Kenmore Station, Buffalo 17, N. Y.

Sintered Bearings

Chemical, mechanical and work characteristics of sintered bearings are listed in a selection chart. Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

Hard Surfacing Wires

Advantages and uses of a copper-coated, alloy-filled wire for automatic welding are given in a 4-page bulletin. McKay Co., 330 McKay Bldg., Pittsburgh 22, Pa.

Crack Inspection

A 4-page bulletin describes inspection for cracks with a dye penetrant packaged in pressurized cans. Magnaflux Corp., 7301 W. Ainslie Ave., Chicago 31, Ill.

AIRengineering at work

REPORT No. 5098B-3

Multiple Screw Driver assembles 400 carburetors per hour

Assembling carburetors was a slow, one-screw-at-a-time operation until AIR engineering solved the bottleneck. Now one operator uses this 8-spindle automatic Multiple Screw Driver to help turn out more than 6 completed carburetors per minute—400 every hour.

This compact, easy-to-operate Multiple Screw Driver is just one more example of how AIR engineering is helping modern industry solve problems and cut production time and costs.

All the experience of Ingersoll-Rand in speeding up fastening through AIR engineering multiple units is yours for the asking. Whether your operations involve screw-driving or nut running with either hand-held or automatic production line units, Ingersoll-Rand can engineer and build just the unit best suited to your needs.

8-Spindle Multiple Screw Driver for carburetor assembly.

Drop us a line if you'd like an AIR engineer to analyze and make recommendations on your fastening operations.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

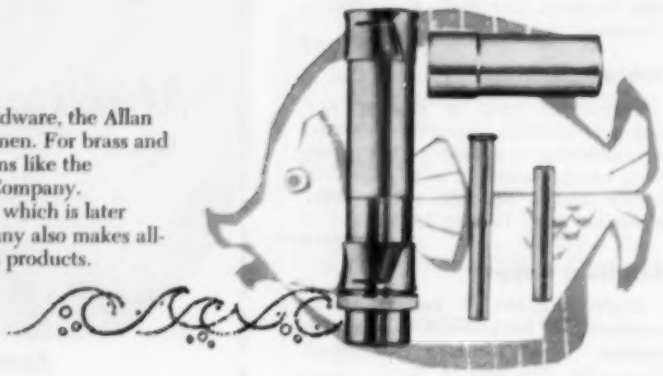
8-341

Short Cuts to Finished Products . . . *by Anaconda*

Aluminum Ferrules For Fishermen—

Allan Manufacturing Company, Hicksville, N. Y.

As the world's largest producer of fishing tackle hardware, the Allan Mfg. Company serves more than 25,000,000 fishermen. For brass and aluminum, the materials used in large quantity items like the ferrules shown, they turn to The American Brass Company. The reel seat and rod ferrules shown are aluminum, which is later anodized and colored. Allan Manufacturing Company also makes all-brass tackle hardware, using many other Anaconda products.



Red Brass Water Supply Nozzle For Thirsty Hens—

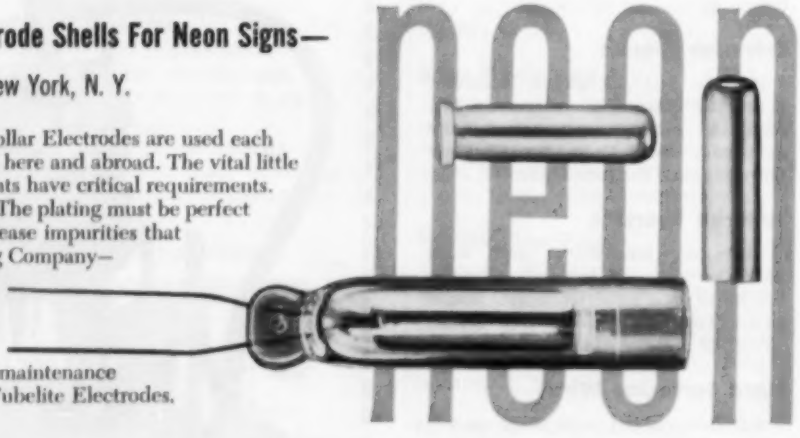
Fox Products Company, Philadelphia, Pa.

The Constant Level Water Valve, made by Fox Products, automatically keeps fresh water available in poultry house troughs to help stimulate maximum growth and egg production. It also protects the health of chickens by shutting off water supply when hens accidentally tip the water trough over. Fox first tried a plastic nozzle on the valve—found it unsatisfactory. Red Brass was a natural for resisting corrosion of the air-water mixture in the nozzle. Instead of tooling up for this part, however, Fox Products found it more economical to have the nozzle made by The American Brass Company.

Nickel-Plated Armco Iron Electrode Shells For Neon Signs—

Tube Light Engineering Company, New York, N. Y.

Millions of these Tubelite Ceramic Collar Electrodes are used each year to keep neon signs glowing, both here and abroad. The vital little nickel-plated iron electrode components have critical requirements. Close tolerances must be maintained. The plating must be perfect—porosity and uneven plating can release impurities that darken tubes. Tube Light Engineering Company—leading manufacturer and distributor of neon tube supplies—turned to the specialized facilities offered by The American Brass Company for both forming and plating, to simplify maintenance of quality standards set up for their Tubelite Electrodes.



The American Brass Company has specialized equipment, such as high-speed multiple-plunger presses, for the economical production of parts like these for industry. It has the experience and skill to design tools which reduce the number of operations and lower production costs—techniques developed over a century of service to manufacturers.

YOUR CHOICE OF METAL: Parts like these can be furnished in copper, brass, bronze, nickel silver, nickel, iron, stainless steel, steel, and aluminum—in a wide variety of finishes.

FOR AN ESTIMATE: Just send a sample, drawing, or description, together with quantity and other pertinent information. Address: The American Brass Company, Waterbury Brass Goods Division, Waterbury 20, Conn.

ANACONDA®

MULTIPLE-PLUNGER PRESS PRODUCTS

Market Outlook

THE STEELWORKERS' STRIKE demonstrates it pays to have inventories.

For several months before the strike, there was a growing awareness (and some apprehension) of the buildup in steel inventories. Many people remembered 1953, when an inventory enlargement was replaced by an inventory reduction and a cut in steel buying. The trouble in 1953 stemmed not from the building of inventories but from the overbuilding of them. An excess in inventory building is like any other excess: It brings unhappy results. Needed in the matter is good judgment.

DOUBLY VALUABLE—If the metalworking industry hadn't laid in large stocks of steel over the last year, it now would be near a closedown. This time, of course, inventories are paying off in two ways: They're keeping plants running, and they're saving money for their buyers (for steel prices are sure to go up).

COMING UP—We'll hear more and more about the importance of keeping proper-sized inventories. Increased automation and pressure for supplemental unemployment benefits are forcing us to level out production dips and peaks. We can't afford to have machinery idle (particularly the big, high investment machinery toward which automation is taking us), and with the drive for SUB it's getting so we can't afford to have men idle, either.

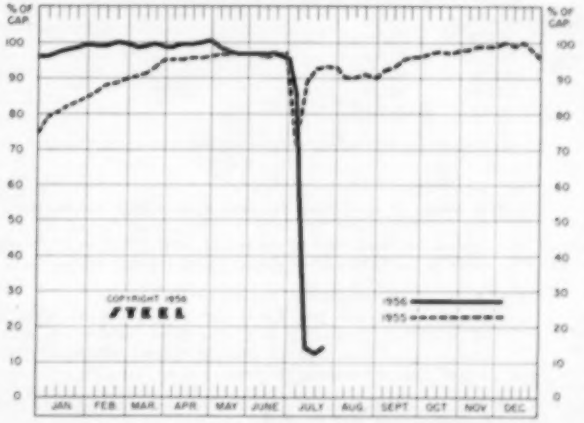
A CHANGE OF WAYS—To assure ability to operate continuously, it's necessary to have sufficient and well-balanced inventories of steel. Needed is a change in the philosophy of buying for inventory. Heretofore, there has been a reluctance to build inventories when steel was plentiful and a rush to build them when demand was strongest and steel most difficult to get.

EXAMPLE— U. S. Steel Corp. observed in its latest annual report that "a perplexing feature of producing and selling steel is that customers simultaneously tend to alternate between sharp increases and sharp decreases in their purchases of steel. Capacity is thereby made alternately to appear either inadequate or excessive. Thus in 1954 U. S. Steel had capacity to supply 38 per cent more steel than customers purchased. Had the customers been able to utilize this capacity there might have been little or no problem of steel shortage in 1955."

PRODUCTION—While most steel users are having to exist now on their inventories, a few continue to receive shipments from unstruck mills. In the week ended July 22, the national rate of steel ingot production was 14.5 per cent of capacity, 2 points over the preceding week.

PRICES RISE—Economic effects that show up ordinarily after the settlement of a steelworkers' strike are coming in advance. Producers of refractories, steel warehouses, steel importers and the unstruck steel producers are raising prices. Makers of refractories (biggest user is the steel industry) are hoisting prices 5 to 15 per cent, warehouses are jumping prices $5 to $12 a ton and importers are again raising prices (this time $3 to $8 a ton). Continued increases by unstruck domestic mills raised STEEL's arithmetical price composite on finished steel to $131.27 a net ton, a rise of 95 cents over the preceding week. Unstruck northern producers are raising pig iron $2.50.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended July 22	Change	Same Week 1955	Same Week 1954
Pittsburgh	2.5	0	97	89.5
Chicago	6.5	+ 0.5	96.5	89.5
Mid-Atlantic	11	+ 2	95	58
Youngstown	5	0	98	60
Wheeling	53.5	— 2.5	92.5	83
Cleveland	0	0	98	66
Buffalo	0	0	105	56
Birmingham	3.5	0	93.5	75
New England	38	+ 30	83	43
Cincinnati	69.5	+ 3.5	84	55.5
St. Louis	84.0	—15.5	88	54
Detroit	43.5	+ 28	87.5	70
Western	30	0	99	80
National Rate	14.5	+ 2	93.5	64.5

INGOT PRODUCTION‡

	Week Ended July 22	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	22.4†	19.7	142.6	139.6
NET TONS (In thousands)	360	317	2,290	2,195

*Change from preceding week's revised rate †Estimated. ‡Amer. Iron & Steel Institute Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954

Metalworking Outlook—p. 31 Technical Outlook—p. 77

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	July 17 1956	July 10 1956	Month Ago	June Average
(1947-1949=100)	158.4	158.3	158.2	158.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	5.414
Tie Plates	5.625	Strip, C.R., Stainless, 493 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.650
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	5.867	Pipe, Line (100 ft)	170.036
Bars, Tool Steel, Carbon (lb)	0.469	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.569	Casing, Oil Well, Alloy (100 ft)	256.036
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	41.530
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.440	Tubing, Mechanical, Carbon (100 ft)	21.360
Bars, H.R., Alloy	9.475	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 302 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	9.333
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb	8.033
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	7.133
Bars, C.F., Carbon	9.000	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.375	Wire, Drawn, Stainless, 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.547
Sheets, Galvanized	7.778	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.590		

STEEL's FINISHED STEEL PRICE INDEX*

	July 18 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	210.45	210.45	210.45	207.63	171.92
Index in cents per lb	5.701	5.701	5.701	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$131.27	$131.27†	$128.98	$126.64	$106.32
No. 2 Fdry Pig Iron, GT	60.84	60.84	60.27	58.99	52.54
Basic Pig Iron, GT	59.96	59.96	59.80	58.49	52.16
Malleable Pig Iron, GT	61.45	61.45	61.27	59.77	53.27
Steelmaking Scrap, GT	46.50	45.50	46.00	40.17	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composites STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 18 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.65	3.76
Bars, H.R., Chicago	4.65	4.65	4.65	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.60	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.60	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.88	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.50	3.70
Plates, Chicago	4.50	4.50	4.50	4.50	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.50	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.325	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	6.217	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	6.45-6.55	4.90
Strip, C. R., Detroit	6.35	6.35	6.35	6.35-6.55	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$84.50	$84.50	$84.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.375	5.375	5.375	5.025	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$62.25	$62.25	$61.00	$59.50	$53.00
Basic, Valley	60.00	60.00	60.00	58.50	52.00
Basic, deld. Phila.	66.26	63.76	63.76	62.16	56.49
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	60.50	59.00	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	64.26	64.26	62.66	56.99
No. 2 Fdry, Birm.	57.00	57.00	55.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	62.70	55.33
Malleable, Valley	60.50	60.50	60.50	59.00	52.50
Malleable, Chicago	60.50	60.50	60.50	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	158.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$44.50	$43.50	$44.50	$39.50	$45.00
No. 1 Heavy Melt, E. Pa.	49.00	47.00	47.50	42.00	43.50
No. 1 Heavy Melt, Chicago	46.00	46.00	46.00	39.00	43.50
No. 1 Heavy Melt, Valley	45.50	44.50	47.50	40.50	45.00
No. 1 Heavy Melt, Cleve.	43.50	42.50	45.50	38.50	44.00
No. 1 Heavy Melt, Buffalo	42.50	42.50	45.50	34.50	44.00
Rails, Rerolling, Chicago	67.50	67.50	67.50	59.00	52.50
No. 1 Cast, Chicago	45.50	45.50	45.50	45.50	49.00

COKE, Net Ton					
Beehive, Furn, Connisvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	17.50

Daily Nonferrous Price Record

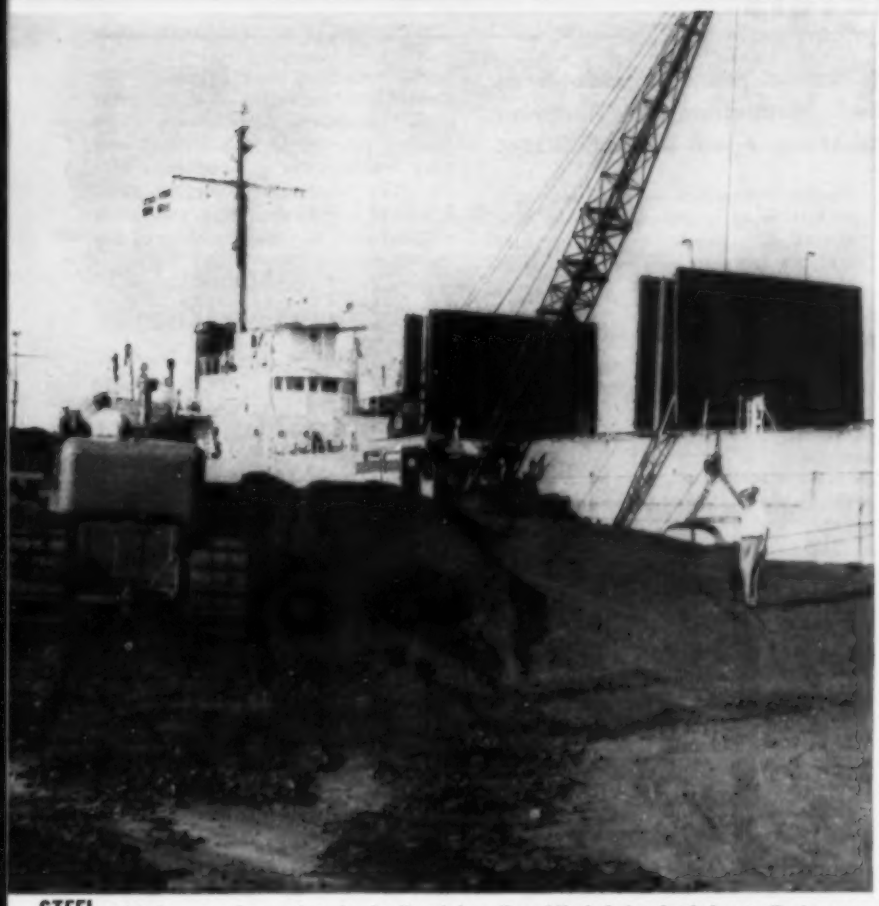
	July 18 Price	Last Change	Previous Price	June Avg.	May Avg.	July 1955 Avg.
Copper	38.00-40.00	July 12, 1956	37.50-40.00	43.000	45.096	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.500	12.250
Tin	95.75	July 18, 1956	96.00	94.611	97.024	97.045
Nickel	84.50	Nov. 24, 1954	60.00	84.500	84.500	84.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	25.900	25.900	23.200
Magnesium	33.75	Apr. 16, 1956	32.50	33.750	33.750	28.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

What You Can Use the Market Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

BARIUM STEEL—active in America's growth



STEEL. Rich iron ore from mines in the Dominican Republic is being loaded onto Barium ore carriers here for import. Averaging between 65% and 69% iron, this high-grade ore will go to service Barium's steel-making facilities, as well as adding to the industry's supply of open hearth lump ore.

ELECTRICAL INDUSTRIES are long-time Barium customers. Made at Bayonne Bolt Corp., these 5/4" by 44½" long bolts are used by General Cable Corp. of Bayonne to assemble the large cable reels above. Washers on this job come from Phoenix Iron & Steel, another member of the Barium team. Whether you're looking for standard or special fasteners, you'll find them at Bayonne.

DREDGING and harbor transport experts are showing keen interest in this 170' hydraulically-controlled dump scow designed by Barium. Made by Barium's Wiley Manufacturing Co., this one goes to J. Rich Steers Sand and Gravel Corporation of New York, while three more are already on order. Maybe this new design could solve some of your dredging or harbor transport problems.

AUTOMOBILES. Some of the body parts for practically 4 out of every 5 American cars today come from Barium's Cuyahoga Spring Company. In addition to these oddly shaped rods and automotive parts Cuyahoga also specializes in springs and flat fasteners for household appliances. Perhaps this specialized experience could help you.

AIRCRAFT jet engine and guided missile manufacturers come to Industrial Forge and Steel for titanium billet forgings. This Barium subsidiary specializes in titanium and is one of the largest forgers of this new, light, strong, heat-resistant metal. If you're interested in a metal with these characteristics, why not check with Industrial.

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STEEL PRODUCERS

Phoenix Iron & Steel Co. (Plate Div.; Structural Div.; Steel Tube Div.; Blast Furnace Div.)

STEEL FABRICATORS & PROCESSORS

Phoenix Bridge Company • Industrial Forge & Steel, Inc. • Globe Forge, Inc. • The Geometric Stamping Company

A GROUP OF INTEGRATED COMPANIES

BARIUM

STEEL CORPORATION

This close-knit, alertly managed team of companies will be glad to put its engineering resources and production facilities at your disposal. See a complete product and service listing in Thomas' Register, Section A to Z, or write to:

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Clyde Iron Works, Inc. • Erie Bolt and Nut Company • Bayonne Bolt Corporation • The Cuyahoga Spring Company • Jacobs Aircraft Engine Company • Wiley Manufacturing Company

LIGHTWEIGHT METAL AND PLASTICS

East Coast Aeronautics, Inc.

Nonferrous Metals

Magnesium finally gets its second primary producer as Brooks & Perkins and Dominion Magnesium form Alabama Metallurgical Corp. Annual capacity will be 10,000 tons

Nonferrous Metal Prices, Pages 114 & 115

BROOKS & PERKINS Inc., Detroit magnesium fabricator, and Dominion Magnesium Ltd., Toronto, Ont., joined forces to form the long-rumored second producer of primary magnesium. Alabama Metallurgical Corp., a subsidiary, has been incorporated under Delaware law and will begin operations in Selma, Ala., in 1957.

Rated at 10,000 tons a year, the new plant will increase this nation's magnesium capacity by about 15 per cent. Prior to the B&P announcement last week, Dow Chemical Co., Midland, Mich., was the only primary producer in the United States. High-purity magnesium (said to be 99.9 plus per cent pure) will be produced from dolomite rock by the Pidgeon process. This is the method used by Dominion for some years in competing successfully for Canadian and American markets.

Combines Know-How—The new corporation combines B&P's know-how in the fabrication of magnesium products with Dominion's experience as a basic producer. E. Howard Perkins, president of B&P, is chairman of the board of Alabama Metallurgical, and Lester G. White, who has been managing director of Dominion, is president.

The new plant will cost about $7 million. Once it is completed, the company expects to operate at capacity.

Markets—The biggest customer for the new company will be the atomic energy industry. High purity magnesium is used as a reducing agent in the production of such strategic materials as uranium, thorium and zirconium. Brooks & Perkins also will use the new metal in the manufacture of its magnesium printing plates.

A hint that further expansion may be in the offing comes from Washington. Office of Defense Mobilization will make a decision within 60 days on the advisability of establishing an expansion goal for magnesium.

Rescue by Government

Once again it's the government to the rescue of the lead and zinc industries. They are both in the sales doldrums because of slack operations in the auto industry and the steel strike. Even though mine and smelter production has been cut back, stocks are still building up at a hefty rate. Zinc producers cut production by about 3000 tons in June, but domestic shipments dropped off more than 6700 tons. The government stockpile took 15,085 tons—more than in any month since February, 1955. But this still left stocks at 70,025 tons, highest level in 15 months. General Services Administration is not expected to up its take this month, so even though production will be cut again, stocks will rise.

The picture in lead is similar, although not as dismal looking, because of less dependence on the steel industry. But officials of neither industry are particularly worried. They feel the situation will be relieved as soon as the strike is over and autos begin new model runs. Prices of both metals will be unaffected by the temporary situation, they believe. The London market is still strong, and they feel that the government's barter plan (exchanging surplus farm products for foreign lead and zinc) will take off any world excess of the metals.

Nickel Diversions Rise

Diversions of nickel from the government stockpile to industry for 1956 are scheduled sharply higher to 68 million pounds from a total of 24 million pounds in 1955.

This does not mean that civilian industry is getting a bigger share of of the nickel being produced. The diversions are to fill increasing military needs and to see that the amount available for civilian uses does not diminish.

These diversions from the government stockpile have resulted in a variety of prices being paid by consumers. Early contracts for the stockpile were negotiated by the government at the market price of 64.50c.

Later the government negotiated with producers for nickel at premium prices which would pay for higher development and production costs. Some of these contracts were negotiated at about 92 cents and part of the metal (estimated at 2 million pounds a month) is flowing to consumers at about 94 cents, which includes a selling cost allowance.

Not all premium-priced metal is reaching consumers at the 94-cent figure. Some is going at figures reported as high as $1.25. Part of the metal is coming from domestic sources in Oregon. The average price for all nickel from stockpile diversions and regular suppliers is about 77 cents a pound.

Added to this are occasional offerings of foreign nickel which have sold as high as $2.50 to $3 a pound and "gray market" metal at $1.50 to $2.50. Despite this multiple pricing setup, the bulk of the metal is being sold at the established price of 64.50c, Port Colborne, Ont., including import duty.

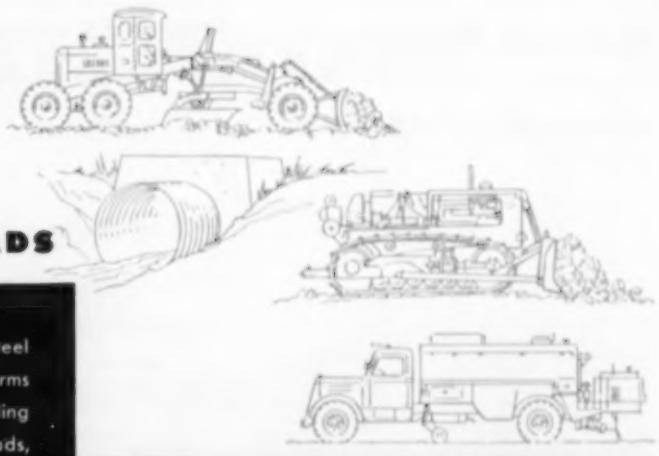
What quantities of nickel will be available in the next few years depends to a considerable extent on future aircraft designs. At a Wright Field symposium, nickel-bearing steels for supersonic aircraft skins were discussed. There also has been talk about use of steels containing very little nickel.

Copper: Supply Catches Up with Demand

	—Crude Production— Primary	Secondary	Refined Production	Deliveries to Fabricators	Refined Stocks, End of Period
Jan.	96,732	10,353	123,798	130,431	50,016
Feb.	89,326	11,697	127,917	139,383	47,053
Mar.	99,681	12,596	144,027	141,590	51,595
Apr.	95,499	13,780	140,032	139,927	54,887
May	98,208	17,475	142,445	140,587	53,443
June	95,105	12,491	133,543	128,573	57,546

Newport Steel

HELPS BUILD ROADS



Substantial tonnages of Newport steel products go into equipment that performs road building miracles under grueling conditions. In many instances these roads, which must withstand the pounding of incessant traffic, are drained by culverts made by Newport Steel. Yet these are but indications of the versatility of the Newport products listed below. Conveniently situated in the heart of America's greatest industrial growth, this 70-year-old company employs highly skilled steelmakers and the most modern facilities to produce fine steels to the exact specifications of leading industries.

PRODUCTS OF
NEWPORT STEEL

- Cold-Rolled Sheets
- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Hot-Rolled Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Electric Weld Line Pipe
- Eave Trough and Conductor Pipe
- Culverts

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.90, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 195, 4.5% Cu, 0.8% Si, 29.30; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 38.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.86 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "P" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.125 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $48.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 95.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.2% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-28.25; No. 12 foundry alloy (No. 2 grade), 24.25-25.00; 5% silicon alloy, 0.60 Cu max, 25.75-26.50; 13 alloy, 0.60 Cu max, 25.75-26.50; 195 alloy, 26.25-27.00; 108 alloy, 24.75-25.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 24.25; grade 3, 23.50; grade 4, 23.00.

Brass Ingot: Red brass, No. 115, 35.50; tin bronze, No. 225, 48.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.75; No. 1 yellow No. 405, 39.75; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.355; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $12.60-$13.10; sheared mill plate, $10.00-$12.00; strip, $12.10-$12.60; wire, $9.00-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	60.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (36,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Piston Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.9	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.9	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.9

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 49.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.05	6	266.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 106.00; .081 in., 75.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.50-17.00; old sheets, 13.00-13.50; borings and turnings, 8.00-8.50; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 29.50-30.00; No. 2 heavy copper and wire, 28.00-28.50; light copper, 25.50-26.00; No. 1 composition red brass, 23.50-24.00; No. 1 composition turnings, 23.00-23.50; yellow brass

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	59.46-59.50	53.50-53.56	63.80	....	25.250	25.000	24.500
Muntz Metal	53.84	49.65	....	....	25.500	25.250	24.750
Naval Brass	55.72	50.03	62.78	58.88	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

turnings, 14.00-14.50; new brass clippings, 21.50-23.00; light brass, 13.50-14.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 19.50-20.00; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 18.50-19.00; brass pipe, 18.00-18.50.

Lead: Heavy, 12.00-12.25; battery plates, 6.50-6.75; linotype and stereotype, 13.50-14.00; electrotype, 12.75-13.00; mixed babbitt, 14.50.

Monel: Clippings, 55.00-85.00; old sheets, 55.00-85.00; turnings, 60.00-70.00; rods, 55.00-85.00.

Nickel: Sheets and clips, 90.00-190.00; rolled anodes, 90.00-190.00; turnings, 80.00-150.00; rod ends, 90.00-190.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.50-19.00; 3003 clippings, 18.50-18.75; 6151 clippings, 18.50-18.75; 5052 clippings, 18.50-18.75; 2014 clippings, 17.50-18.25; 2017 clippings, 17.50-18.25; 2024 clippings, 17.50-18.25; mixed clippings, 17.25-17.50; old sheets, 15.75-16.00; old cast, 15.75-16.00; clean old cable (free of steel), 17.50-18.50; borings and turnings, 15.25-17.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 30.50; light copper, 28.25; refinery brass (60% copper) per dry copper content, 29.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 30.50; light copper, 28.25; No. 1 composition borings, 26.00; No. 1 composition solids, 26.50; heavy yellow brass solids, 17.50; yellow brass turnings, 16.00; radiators, 20.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval 57.54, 5000-10,000 lb; electrodeposited, 50.25; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, 114.50; 200-499 lb, 113.00; 500-999 lb, 112.50; 1000 lb or more, 112.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 30.35; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 69.40; 100-600 lb, 61.10; 700-1900 lb, 58.60; 2000-9900 lb, 56.90; 10,000 lb or more, 55.70.

Stannous Chloride (anhydrous): Less than 25 lb, 165.90; 25 lb, 130.90; 100 lb, 115.90; 400 lb, 133.50; 5200-19,600 lb, 101.30; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, 128.70; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: Under 1000 lb, 84.30; 1000 lb and over, 52.30.

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to products, page 117; to footnotes, page 119

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)
Detroit R7 .....$69.00
Houston 85 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 .....$66.50
Bessemer,Pa. U5 .....68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ....82.50
Gary,Ind. U5 .....68.50
Johnstown,Pa. B2 .....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 .....74.50
Munhall,Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill. R2, U5 ..68.50
S.Duquesne,Pa. U5 .....68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19 ..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3 ..97.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 ....100.50
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston 85 .....101.00
Johnstown,Pa. B2 .....84.50
Lackawanna,N.Y. B2 ..84.50
LosAngeles B3 .....96.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2, U5 .....84.50
S.Chicago W14 .....89.50
S.Duquesne,Pa. U5 .....84.50
S.SanFrancisco B3 .....94.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 .....$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 .....96.00
Conshohocken,Pa. A3 ..111.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....127.00
Gary,Ind. U5 .....96.00
Houston 85 .....105.00
Ind.Harbor,Ind. Y1 .....96.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2, U5 .....96.00
S.Chicago W14 .....101.00
S.Duquesne,Pa. U5 ..96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....106.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2 .....103.50
S.Chicago W14 .....108.50
S.Duquesne,Pa. U5 ..103.50

SKELP
Aliquippa,Pa. J5 .....4.325
LoneStar,Tex. L6 .....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2, .4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS
AlabamaCity,Ala. R2 ..5.375
Aliquippa,Pa. J5 .....5.375
Alton,Ill. L1 .....5.55
Buffalo W12 .....5.375
Cleveland A7 .....5.375
Donora,Pa. A7 .....5.375
Fairfield,Ala. T2 .....5.375
Houston 85 .....5.625
IndianaHarbor,Ind. Y1..5.375
Johnstown,Pa. B2 .....5.375
Joliet,Ill. A7 .....5.375
KansasCity,Mo. 85 .....5.625
Kokomo,Ind. C16 .....5.475
LosAngeles B3 .....6.175
Minnequa,Colo. C10 ...5.625
Monessen,Pa. P7 .....5.375
N.Tonawanda,N.Y. B11 5.375
Pittsburg,Calif. C11 ..6.025
Portsmouth,O P12 .....5.725
Roebling,N.J. R5 .....5.475
S.Chicago,Ill. R2 .....5.375
SparrowsPoint,Md. B2..5.475
Sterling,Ill.(1) N15 ...5.375
Sterling,Ill. N15 .....5.475
Struthers,O. Y1 .....5.375
Worcester,Mass. A7 ..5.675

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....4.80
Aliquippa,Pa. J5 .....4.80
Bessemer,Ala. T2 .....4.80
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 ....5.75
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston 85 .....4.70
Ind.Harbor,Ind. I-2 .....4.60
Johnstown,Pa. B2 .....4.65
KansasCity,Mo. 85 .....4.70
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 .....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 .....5.15
Portland,Oreg. O4 .....5.35
Seattle B3 .....5.35
S.Chicago W14 .....4.65
S.Chicago,Ill. U5 .....4.60
S.SanFrancisco B3 .....5.25
Torrance,Calif. C11 .....5.30
Weirton,W.Va. W6 .. 4.60

Wide Flange
Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 .....5.90
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 .....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes
Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.35
Gary,Ind. U5 .....5.65
Houston 85 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 .....7.90
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston 85 .....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. 85 .....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5 .....6.75
S.Chicago W14 .....7.00
S.SanFrancisco B3 .....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ....5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ..4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....5.35
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 .....4.80
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ...5.65
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GranitCity,Ill. G4 .....5.15
Harrisburg,Pa. P4 .....5.10
Houston 85 .....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ..4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.90
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.90
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5 .....4.50
S.Chicago W14 .....4.75
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 .....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....6.80
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.138

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 .....6.725
Coatesville,Pa. L7 .....7.025
Conshohocken,Pa. A3 ..7.175
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 ..7.875
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston 85 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5 .....6.725
S.Chicago W14 .....6.975
SparrowsPoint,Md. B2 ..6.725
Warren,O. R2 .....6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy
Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 .....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif.(30) K1 ..7.70
Gary,Ind. U5 .....6.30
Houston 85 .....6.40
Ind.Harbor,Ind. Y1 .....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....7.00
Seattle B3 .....7.30
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5 .....6.30
S.Chicago W14 .....6.55
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES
Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..6.025
Harrisburg,Pa. P4 .....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 .....4.65
Aliquippa,Pa.(9) J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta(9) A11 .....5.15
Bessemer,Ala.(9) T2 .....4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo(9) R2 .....4.65
Canton,O.(9) R2 .....4.75
Clairton,Pa.(9) U5 .....4.65
Cleveland(9) R2 .....4.65
Ecorse,Mich.(9) G5 .....4.75
Emeryville,Calif. J7 .....5.40
Fairfield,Ala.(9) T2 .....4.65
Fairless,Pa.(9) U5 .....4.80
Fontana,Calif.(9) K1 ....5.80
Gary,Ind.(9) U5 .....4.65
Houston(9) 85 .....4.90
Ind.Harbor,Ind.(9) I-2..4.65
Ind.Harbor,Ind. Y1 .....4.65
Johnstwn,Pa.(9) B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo.(9) 85 ..4.90
Lackawanna(9) B2 .....4.65
LosAngeles(9) B3 .....5.35
Massillon,O.(9) R2 .....4.75
Midland,Pa.(9) C18 .....4.65
Milton,Pa. M18 .....5.25
Minnequa,Colo. C10 .....5.10
Newark,N.J. W18 .....4.75
Pittsburg,Calif.(9) C11 ..5.35
Pittsburgh(9) J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago W14 .....4.90
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5 ..4.65
S.SanFran.,Calif.(9) B3 5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif.(9) C11 ..5.35
Warren,O.(9) R2 .....4.65
Weirton,W.Va.(9) W6 ..4.65
Youngstown(9) R2, U5..4.65

BARS, H.R. Loaded Alloy
Warren,O. C17 .....7.075

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 .....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fairless,Pa. U5 .....5.725
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....5.575
Houston 85 .....5.825
Ind.Harbor,Ind. I-2, Y1.5.575
Johnstown,Pa. B2 .....5.575
KansasCity,Mo. 85 .....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago R2, U5 .....5.575
S.Chicago W14 .....5.825
S.Duquesne,Pa. U5 .....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....6.075
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.95
Gary,Ind. U5 .....6.80
Houston 85 .....7.05
Ind.Harb.,Ind. I-2, Y1..6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. 85 .....7.05
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....7.05
S.Duquesne,Pa. U5 .....6.80
S.SanFrancisco B3 .....7.25
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES, H.R. Carbon
Bethlehem,Pa.(9) B2 ...4.80
Lackawanna(9) B2 .....4.65

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....5.15
Fontana,Calif. K1 .....5.35
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SanFrancisco B7 .....5.05

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston 85 .....5.90
KansasCity,Mo. 85 .....5.90
Youngstown U5 .....5.65

BARS, C.F. Loaded Alloy
Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 .....8.35
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 .....8.30
Warren,O. C17 .....9.075

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 .....6.30
Camden,N.J. P13 .....6.85
Carnegie,Pa. C12 .....6.25
Chicago W18 .....6.25
Cleveland A7, C20 .....6.25
Detroit B5, P17 .....6.45
Detroit R7 .....6.25
Donora,Pa. A7 .....6.25
Elyria,O. W8 .....6.25
FranklinPark,Ill. N5 ...6.25
Gary,Ind. R2 .....6.25
GreenBay,Wis. F7 .....6.25
Hammond,Ind. I.2, M18..6.25
Hartford,Conn. R2 .....6.75
Harvey,Ill. B5 .....6.25
LosAngeles(49) S30 ....7.70
LosAngeles R2 .....7.70
Mansfield,Mass. B5 ....6.80
Massillon,O. R2, R8 ....6.25
Midland,Pa. C18 .....6.25
Monaca,Pa. S17 .....6.25
Newark,N.J. W18 .....6.70
NewCastle,Pa.(17) B4 ..6.25
Pittsburgh J5 .....6.25
Plymouth,Mich. P5 .....6.50
Putnam,Conn. W18 .....6.80
Readville,Mass. C14 .....6.80
S.Chicago,Ill. W14 .....6.50
SpringCity,Pa. K3 .....6.70
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. W19 ..6.70
Youngstown F3, Y1 ....6.25

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 5.15

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.75
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 .....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. F7 .....7.425
Hammond,Ind. I.2, M18 7.425
Hartford,Conn. R2 .....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....8.10
Mansfield,Mass. B5 ..7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 .....7.625
S.Chicago W14 .....7.675
SpringCity,Pa. K3 .....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.925
Waukegan,Ill. A7 .....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 .....4.65
Atlanta A11 .....5.15
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
Fairless,Pa. U5 .....4.80
Fontana,Calif. K1 .....5.80
Ft.Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 .....4.65
Houston 85 .....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 5.25
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... *5.85*
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla. S3 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 .... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5 .... 4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ... 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 6.15
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ⅝-1" B2 .. 6.15
Williamsport,Pa. S19 .. 6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.. 4.65
ChicagoHts.(4) C2, I-2.. 4.65
Ft.Worth,Tex.(26) T4 .. 5.10
Franklin,Pa.(3) F5 .... 4.65
Franklin,Pa.(4) F5 .... 4.65
JerseyShore,Pa.(4) J8 .. 4.65
Marion,O.(3) P11 ..... 4.65
Moline,Ill.(3) R2 ..... 4.80
Tonawanda(3) B12 .... 5.15
Tonawanda(4) B12 .... 5.15
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ... 11.50
McK.Rks.(D.R.) L5 ... 16.00
McK.Rks.(Staybolt) L5 .17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 ..... 4.325
Conshohocken,Pa. A3 .. 4.775
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
Fairless,Pa. U5 ..... 4.375
Fontana,Calif. K1 ..... *5.575*
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 ..... 4.425
GraniteCity,Ill. G4 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 4.325
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6 (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .... 4.725
Niles,O. M21 ..... 4.325
Pittsburgh,Calif. C11 .. 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.725
Riverdale,Ill. A1 ..... *4.725*
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.575
SparrowsPoint,Md. B2.. 4.325
Steubenville,O. W10 ... 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .... 4.325
Youngstown U5, Y1 ... 4.325

SHEETS, H.R., (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Niles,O. M21 ..... 5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 .... 7.20
Gary,Ind. U5 ..... 7.20
Ind.Harbor,Ind. Y1 .... 7.20
Newport,Ky. N9 ..... *7.90*
Youngstown Y1, U5 .... 7.20

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .... 6.375
Conshohocken,Pa. A3.. 6.825
Dravosburg,Pa. U5 ... 6.375
Ecorse,Mich. G5 .. .. 6.475
Fairfield,Ala. T2 ..... 6.375
Fairless,Pa. U5 ..... 6.425
Fontana,Calif. K1 ..... *7.625*
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2.. 6.375
Warren,O. R2 ..... 6.375
Youngstown U5, Y1 ... 6.375

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ... 4.575
Ind.Harbor,Ind. I-2 ... 4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 ..... 5.325
Conshohocken,Pa. A3 .. 5.775
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
Fairless,Pa. U5 ..... 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 ..... *7.075*
Gary,Ind. U5 ..... 5.325
GraniteCity,Ill. G4 .... 6.025
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.925
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.925
SparrowsPoint,Md. B2.. 5.325
Steubenville,O. W10.... 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.875
Dravosburg,Pa. U5 .... 7.875
Ecorse,Mich. G5 ..... 7.975
Fairless,Pa. U5 ..... 7.925
Fontana,Calif. K1 ..... *9.625*
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 .... 5.825

SHEETS, Culvert

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.39	6.45
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.60	...
MartinsFry. W10	6.10	...
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Gary,Ind. U5 ..... 6.35
MartinsFry,O. W10 .... 6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.85†
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85†
Dover,O. R1 ..... 5.85†
Dravosburg,Pa. U5 .... 5.85†
Fairfield,Ala. T2 ..... 5.85†
Gray,Ind. U5 ..... 5.85†
GraniteCity,Ill. G4 .... 6.65†
Ind.Harbor,Ind. I-2 .... 5.85†
Kokomo,Ind. C16 ..... 6.35†
MartinsFerry,O. W10 .. 5.55*
Middletown,O. A10 ... 5.85†
Pittsburg,Calif. C11 ... 6.60*
Pittsburgh J5 ..... 5.85†
SparrowsPt.,Md. B2 .... 5.85†
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 ... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ..... *7.075*

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 .... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 .... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 ..... *6.60*
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. M21 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ... 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. M21 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburg Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Tuchalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.375
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.775
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	*5.575*
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles (25) B3	5.075
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	*4.725*
SanFrancisco S7	5.06
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.575
S.SanFrancisco(25) B3	5.075
SparrowsPoint Md. B2	4.325
Sterling,Ill.(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.60
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	*9.65*
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	*7.90*
Sharon,Pa. S3	7.20
S.Chicago W14	7.45
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer Ala. T2	6.425
Conshohocken,Pa. A3	6.825
Ecorse,Mich. G5	6.525
Fairfield Ala. T2	6.425
Fontana,Calif. K1	*8.025*
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.70
Dearborn Mich. D3	6.35
Detroit M1, P20	6.35
Detroit D2	6.95
Dover,O. G6	*6.85*
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	*8.70*
Franklin Park,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y-1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(16) S18	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	6.70
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	*6.95*
Rome,N.Y. (32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2 T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	...	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(16) S18	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
NewYork W3	...	9.35	10.90	13.05	15.75
Pawtucket R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(33) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

STRIP, Galvanized

Cleveland A7	6.25*
Dover,O. G6	*6.85**
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	*9.00*	*9.95*	*10.55*	*11.55*	*12.45*
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	10.70	11.70	12.60
GraniteCity,Ill. G4	*9.30**	*10.30**	*10.90**	*11.90**	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-72	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	....	14.85	15.85	17.45	17.95	....
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Fairless,Pa. U5	8.40	8.65	9.05
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Har. I-2, Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40

Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	*7.25*
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill. L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O.(24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	7.20
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	7.55
Portsmouth,O. P12	7.10
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.80
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P7, P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	8.60
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P7, P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	8.30
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	13.05
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	11.50
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P7, P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P16	11.35
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	....14.15
Monessen,Pa. P16	.....14.20
Roebling,N.J. R5	.....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....9.50
Baltimore T6	.....9.50
Boston T6	.....9.50
Buffalo W12	.....9.50
Cleveland A7	.....9.50
Crawfordsville,Ind. M8	..9.50
Dover,O. G6	*.....10.25*
Fostoria,O. S1	.....9.50
FranklinPark,Ill. T6	...9.60
Kokomo,Ind. C16	.....9.50
Massillon,O. R8	.....9.50
Milwaukee C23	.....9.70
Monessen,Pa. P7, P16	..9.50
Pawtucket,R.I. N8	....9.80
Riverdale,Ill. A1	.....9.60
Rome,N.Y. R6	.....9.50
Trenton,N.J. R5	.....9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(20) M8	..163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	169
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	..$9.05
Wheeling,W.Va. W10	...9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(20) M8	..163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	169
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity, Ala. R2	.$9.45
Bartonville,Ill. K4	.....9.45
Buffalo W12	.....9.45
Crawfordsville,Ind. M8	..9.55
Donora,Pa. A7	.....9.45
Duluth,Minn. A7	.....9.45
Jacksonville,Fla. M8	..10.01
Johnstown,Pa. B2	....9.45
Joliet,Ill. A7	.....9.45
Kokomo,Ind. C16	.....9.55
LosAngeles B3	.....10.24
Minnequa,Colo. C10	....9.60
Pittsburg,Calif. C11	..10.23
S.Chicago,Ill. R2	.....9.45
SparrowsPt.,Md. B2	....9.55
Sterling,Ill. N15	.....9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.75
Bartonville,Ill. K4	....9.75
Buffalo W12	.....9.75
Crawfordsville,Ind. M8	..9.85
Donora,Pa. A7	.....9.75
Duluth,Minn. A7	.....9.75
Jacksonville,Fla. M8	..10.31
Johnstown,Pa. B2	....9.75
Joliet,Ill. A7	.....9.75
Kokomo,Ind. C16	.....9.85
LosAngeles B3	.....10.55
Minnequa,Colo. C10	....9.90
Pittsburg,Calif. C11	..10.55
S.Chicago,Ill. R2	.....9.75
SparrowsPt.,Md. B2	....9.85
Sterling,Ill. N15	.....9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	..$9.80
Bartonville,Ill. K4	....9.80
Buffalo W12	.....9.80
Crawfordsville,Ind. M8	..9.90
Donora,Pa. A7	.....9.80
Duluth,Minn. A7	.....9.80
Jacksonville,Fla. M8	..10.36
Johnstown,Pa. B2	....9.80
Joliet,Ill. A7	.....9.80
Kokomo,Ind. C16	.....9.90
LosAngeles B3	.....10.60
Minnequa,Colo. C10	..9.95
Pittsburg,Calif. C11	...10.60
S.Chicago,Ill. R2	.....9.80
SparrowsPt.,Md. B2	...9.90
Sterling,Ill. N15	.....9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..175**
Aliquippa,Pa. J5	.....172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	..181
Donora,Pa. A7	.....175†
Duluth,Minn. A7	.....175†
Fairfield,Ala. T2	.....175†
Houston,Tex. S5	....180**
Jacksonville,Fla. M8	...186
Johnstown,Pa. B2	....179*
Joliet,Ill. A7	.....175†
KansasCity,Mo. S5	..180**
Kokomo,Ind. C16	.....193†
Minnequa,Colo. C10	...180**
Monessen,Pa. P7	.....178††
Pittsburg,Calif. C11	....195†
Rankin,Pa. A7	.....175†
S.Chicago,Ill. R2	.....175**
S.SanFrancisco C10	...195**
SparrowsPoint,Md. B2	..181*
Sterling,Ill.(1) N15	...179††

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.....162**
Aliq'ppa,Pa.9-14½ga.J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	..168
Donora,Pa. A7	.....162†
Duluth,Minn. A7	.....162†
Fairfield,Ala. T2	.....162†
Houston,Tex. S5	.....167**
Jacksonville,Fla. M8	173
Johnstown,Pa. (43) B2	..166
Joliet,Ill. A7	.....162†
KansasCity,Mo. S5	....167**
Kokomo,Ind. C16	.....180†
Minnequa,Colo. C10	...167**
Monessen,Pa. 9 ga. P7	.166††
Pittsburg,Calif. C11	..185†
Rankin,Pa. A7	.....162†
S.Chicago,Ill. R2	....162**
Sterling,Ill.(1) N15	...166††

	An'ld Galv.
WIRE (16 Gage)	**Stone Stone**
Ala.City R2	...14.50 16.05**
Bartonville K4	..14.50 16.55
Buffalo W12	....14.50 ....
Cleveland A7	....14.50 ....
Crawf'dsville M8	14.60 16.55
Fostoria,O. S1	..14.60 16.15†
Jacksonville M8	..14.85 16.80
Johnstown B2	..14.50 16.40*
Kokomo C16	....15.10 16.65†
Minnequa C10	..14.75 16.45**
Palmer,MassW12	14.50 16.05*
Pitts.,Calif. C11	14.85 16.40†
S.Chicago R2	..14.50 16.05**
SparrowsPt. B2	..14.60 16.50*
Sterling(1) N15	14.50 16.45††
Waukegan A7	..14.50 16.05
Worcester A7	....14.80 ....

	Merchant Quality	
WIRE,	**(6 to 8 gage)**	**An'ld Galv.**
Ala.City,Ala. R2	.7.50	7.90**
Aliquippa J5	....7.40	7.925§
Atlanta A11	.... 7.60	8.20
Bartonville(48) K4	7.60	8.20
Buffalo W12	.....7.50	7.90†
Cleveland A7	....7.50	....
Crawfordsville M8	.7.60	8.20
Donora,Pa. A7	...7.50	7.90†
Duluth,Minn. A7	..7.50	7.80†
Fairfield T2	.....7.50	7.90†
Houston(48) S5	..7.65	8.05**
Jacks'ville,Fla. M8	7.85	8.45
Johnstown B2(48)	7.50	8.10*
Joliet,Ill. A7	....7.50	7.90†
Kans.City(48) S5	.7.65	8.05**
Kokomo C16	.... 8.10	8.50
LosAngeles B3	...8.45	9.05*
Minnequa C10	...7.65	8.05**
Monessen P7(48)	.7.40	8.00††
Palmer,Mass. W12	7.80	8.20*
Pitts.,Calif. C11	..8.45	8.85†
Portsmouth,O. P12	8.00	....
Rankin,Pa. A7	...7.50	7.90†
S.Chicago R2	....7.50	7.90**
S.SanFran. C10	..8.35	8.75**
Spar'wsPt. B2(48)	7.60	8.20*
Str'ling(1)(48) N15	7.40	8.00††
Struth'rs,O(48) Y1	7.50	8.00‡
Worcester,Mass.A7	7.80	8.20†

Based on zinc price of: *13.50c. †5c. ‡10c. §Less than 16c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	...175
Atlanta A11	175
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla. M8	182
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	179
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.,Calif. C10	..197
SparrowsPoint,Md. B2	177
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	..157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	...157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted):	
½" x 6" and smaller.	61

†½" x 6" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED

(Nuts not attached; bulk)

⅛" to ½" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅛" to ½" diam., incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces.	61
100,000 or more pieces	64

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
⅛" to ½" diam. incl.:	
15,000 to 99,999 pieces	20
100,000 or more	27

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:

6" and shorter:	
¼" through ⅝" diam.	34
⅞" & ¾" diam.	31
⅞", 1", 1"	8
Longer than 6":	
¼" through ⅝" diam.	3
¾" through 1" diam.	+12

High Carbon, Heat-treated:

6" and shorter:	
¼" through ½" diam.	20
⅝" & ¾" diam.	16
⅞", 1", 1"	+11
Longer than 6":	
¼" through ⅝" diam.	+23
¾" through 1" diam.	+41

(New Std. Hexagon head, upset, bulk)

Bright:

⅛" x 6" & smaller & shorter	49
⅞", ½", ⅝" diam. x 6" & shorter	48
⅝", ¾", 1" x 6" & shorter	31

High Carbon, Heat-treated:

⅛" x 6" & smaller & shorter	41
⅞" x ⅝" diam. & 6" & shorter	29
⅝", ¾", 1" x 6" & shorter	20

NUTS

Reg. & Heavy Square Nuts:

All sizes	61

H.P. Reg. & Heavy Hex Nuts:

⅝" & smaller	64
⅝" to 1⅛" incl.	63
1⅛" to 1¼" incl.	65
1⅝" & larger	61

C.P. Reg. & Heavy Hex Nuts

⅝" & smaller	64
⅝" & larger	61

Semifinished & Finished Nuts

⅝" & smaller	66
⅝" & larger	63

Semifinished Slotted Reg. & Heavy Hex Nuts

⅝" & smaller	66
⅝" & larger	63

Hot Galvanized Nuts, all types

1⅛" & smaller	44

(On above items, add 25% for less than case quantities)

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅝" incl., Square:	
25,000 to 199,999 pieces	30
200,000 or more pieces	27
No. 2 to ⅝" incl., Hex.:	
25,000 to 199,999 pieces	13
200,000 or more pieces	25

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under. List less 32½

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft., inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.55	20.90
1¼	13	....	25.53	21.25
1½	13	24.24	28.22	23.50
1⅝	13	28.63	33.34	27.76
2	13	32.09	37.37	31.13
2½	13	36.14	42.09	35.05
2½	12	39.23	45.67	38.05
2½	12	43.22	50.31	41.91
2⅝	12	46.79	54.48	45.38
3	12	49.90	58.10	48.39

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	615
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...(16)5.65	
Lackawanna,N.Y. B2	....	....	...(16)5.65	
Lackawanna,N.Y. B2	4.725	4.625	....	
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	....5.625
Gary,Ind. U5	.....5.625
Ind.Harbor,Ind. I-2	..5.625
Lackawanna,N.Y. B2	.5.625
Minnequa,Colo. C10	...5.625
Seattle B3	.....5.775
Steelton,Pa. B2	.....5.625
Torrance,Calif. C11	...5.775

TRACK BOLTS, Untreated

Cleveland R2	.....12.15
KansasCity,Mo S5	...12.90*
Lebanon,Pa. B2	.....12.15
Minnequa,Colo. C10	...12.15
Pittsburgh O3, P14	...12.15
Seattle B3	.....12.65

*Treated

AXLES

Ind.Harbor,Ind. B13	....7.50
Johnstown,Pa. B2	.....7.50

JOINT BARS

Bessemer,Pa. U5	....5.825
Fairfield,Ala. T2	....5.825
Ind.Harbor,Ind. I-2,...	5.825
Joliet,Ill. U5	.....5.825
Lackawanna,N.Y. B2	..5.825
Minnequa,Colo. C10	...5.825
Steelton,Pa. B2	.....5.825

SCREW SPIKES

Cleveland R2	.....11.90
Pittsburgh O3	.....11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....8.05
Ind.Harbor,Ind. I-2, Y1	..8.05
KansasCity,Mo. S5	....7.90
Lebanon,Pa. B2	.....8.05
Minnequa,Colo. C10	....7.90
Pittsburgh J5	.....8.05
Seattle B3	.....8.55
S.Chicago,Ill. R2	.....8.05
Struthers,O. Y1	.....8.05
Youngstown R2	.....8.05

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 2 cents lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.242 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.00c for cut lengths.
(35) 12" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	27c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N3	4	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	¼		⅜		½		¾		⅞		1		1¼	
List Per Ft	8.5c		6c		8.5c		11.5c		17c		23c			
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	23	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.66		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	40.25	....	43.75	45.25	47.25	50.00	54.25	54.25
305	23.25	30.50	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	25.00	32.00	40.00	....	42.75	45.25	47.50	51.75	54.00	54.00
309	32.50	41.25	48.25	....	55.00	54.00	56.75	60.25	69.00	69.00
310	39.75	50.50	64.75	....	71.00	72.25	76.50	78.25	81.75	81.75
314	....	....	....	....	....	72.75	....	78.25	....	....
316	33.00	41.75	52.75	....	59.75	59.75	62.75	66.00	70.25	70.25
316L	....	....	58.75	....	65.75	66.75	69.75	73.00	77.25	77.25
317	40.25	51.25	65.75	....	76.50	74.75	78.50	81.00	87.75	87.75
321	26.50	33.50	39.75	....	45.75	45.00	47.25	51.25	56.25	56.25
18-8CbTa	30.75	39.50	47.25	....	54.75	52.75	55.50	60.00	68.50	68.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	20.25	31.00	35.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co., Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	30.50
304	31.55	37.95	32.50
304-L	34.10	40.90	....
316	36.50	42.75	47.00
316-L	42.30	50.10	....
316-CH	42.50	50.50	....
321	33.25	39.65	37.25
347	36.20	44.35	48.25
405	26.35	33.85	....
410	28.85	33.35	....
430	28.85	33.35	....
Inconel	50.00	65.95	....
Nickel	41.60	56.15	....
Nickel, Low Carbon	43.80	60.55	....
Monel	44.50	60.50	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	33.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...	.....	4.1900
18.25	4.25	1	4.75	...	.....	2.305-2.475
18	4	2	9	...	.....	2.675-2.6775
18	4	2	....	...	.....	1.765
18	4	1	....	...	.....	1.600
13.75	3.75	2	5	...	.....	2.245
13.5	4	3	....	...	.....	1.865
9	3.5	..	....	...	.....	1.180
6	4	2	....	5	.....	1.105
6	4	3	....	6	.....	1.350
1.5	4	1	....	8.5	.....	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	59.00†	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y., deld.	63.02	63.52	64.02	....
Syracuse,N.Y., deld.	64.12	64.62	65.12	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago,Ill. R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich., Deld.	....	67.18	67.18	....
Cleveland District				
Cleveland K2, A7	60.00	60.50	60.50	61.00
Akron,O., deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
New York, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland, Pa. A3	*64.50*	*65.00*	*65.50*	*66.00*
Philadelphia, deld.	*66.26*	*66.76*	*67.26*	*67.76*
Troy,N.Y. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.76	64.76	65.29
Verona,Trafford, deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.68	65.60	66.13
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton,Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Mansfield,O., deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	*70.00*	*70.50*	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	66.76	66.26	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.21-0.50%.
†Phos. 0.70-0.90; intermediate (Phos. 0.31-0.70%), $60
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.69%), $56

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 (Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.74	8.60	9.00	....	8.20	8.20	8.73	8.99¹	14.89	8.44	8.06	9.62
Birmingham	7.63‖	8.50‖	8.85‖	....	7.71	7.77	8.95	...	....	7.93	7.95	10.00
Boston	8.62	9.32	10.82	....	8.71	8.71	9.26	10.36	14.16	8.77	8.91	10.34
Buffalo	7.70	8.50	10.51	....	7.85	7.85	8.55	8.40	14.00	8.10	8.30	9.50
Chattanooga	7.78‖	8.69‖	8.60‖	....	7.86	7.92	8.45	...	....	8.13	8.10	9.82
Chicago	7.63	8.49	9.60	....	7.71	7.77	8.30	8.25	13.65	7.93	7.95	9.22
Cincinnati	7.75	8.48	9.60	....	7.95	8.01	8.54	8.65	13.90	8.40	8.24	9.47
Cleveland	7.63	8.49	9.45	....	7.81	7.83	8.36	8.50	13.71	8.26	8.12	9.39
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.82	8.68	9.88	....	7.99	8.05	8.58	8.54	13.89	8.40	8.23	9.41
Erie, Pa.	7.08	8.24	8.95¹⁰	....	7.31	7.35	...	8.10¹⁰	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.95	14.00	8.20	8.00	9.20
Jackson, Miss.	7.96‖	8.77‖	9.22‖	....	7.94	8.09	8.62	...	....	8.25	8.27	9.94
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.40	8.30	8.75	10.85
Milwaukee	7.72	8.58	9.69	....	7.80	8.86	8.39	8.44	13.74	8.10	8.04	9.31
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.28	9.13	10.13	56.13	8.73	8.66	9.21	10.27	14.07	8.61	8.71	10.09
Norfolk, Va.	7.35	...	...	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.84	8.69	9.91	....	8.49	8.23	8.76	9.02	13.85	8.25	8.22	9.33
Pittsburgh	7.63	8.74	9.90	52.00	7.81	7.77	8.30	8.50	13.65	7.93	7.95	9.22
Portland, Oreg.	8.30	8.80	10.80	....	8.55	8.25	...	12.55	15.30	8.20	8.20	10.10
Richmond, Va.	7.85	...	9.99	....	8.45	8.45	8.80	10.00	....	8.70	8.15	9.85
St. Louis	7.92	8.78	9.89	....	8.00	8.06	8.59	8.79	13.94	8.33	8.24	9.51
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.40²	8.25	8.30	10.50
Seattle	8.75	10.50	10.90	49.60	8.90	8.60	9.15	12.25	14.75	8.50	8.50	10.70
Spokane, Wash.	8.75	11.10	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	8.31	10.43	...	....	8.99	8.74	...	9.90	....	9.02	8.64	11.10

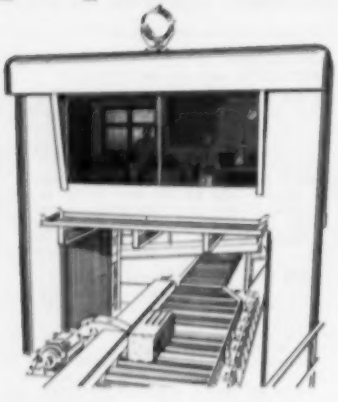
*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 2000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ¹—400 to 999 lb; ²—2000 to 3999 lb; ¹⁰—2000 lb and over.

Now... EC&M

AUTOMATIC-POSITIONING Control

sets blooming mill screwdowns to *pin point* accuracy . . .



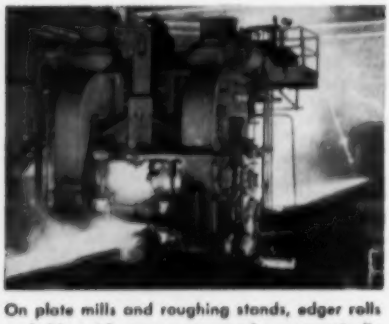
Reduces roller's tasks 1/3

•—•

New operators learn faster

•—•

Accurate drafts reduce rejections



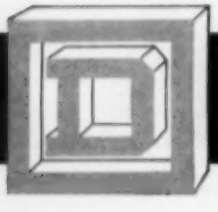
On plate mills and roughing stands, edger rolls and side guide movements can be automatically coordinated with screwdown movements.

Indexes *automatically* from pass to pass to speed rolling and cut costs . . .

To meet the challenge of ever-increasing costs, rolling mill management-teams are turning to automatic operation of screwdowns and associated drives. Precise roll drafts give a higher quality product and new operators become seasoned in a shorter time. Removing the need to coordinate the screwdown with mill reversal enables the roller to concentrate on the manipulation of main motor and work tables for faster and more efficient operation.

The roller pushes a momentary-button only once for each pass, and the rolls are driven to the exact pre-selected settings . . . no overtravel with subsequent inching into position. The operation is entirely automatic for each complete rolling schedule.

This EC&M Automatic-Positioning Screwdown Control system is readily applied to ferrous and non-ferrous mills. New Booklet 9250 fully describes this control and shows many interesting installations. Write for your copy.



SQUARE D COMPANY

EC & M DIVISION • CLEVELAND 28, OHIO

Lead addition to the steel can effect an improvement in the machinability rate of the adjustment plug above by 25 to 40 per cent

Leaded Steel Gains 60%

Better machinability is its biggest selling point; limited availability its biggest drawback. But estimated output this year is up to 40,000 tons a month

IF THE UPWARD sales curve of leaded steels is deflected in the second half of this year, it will be because of lost production during the steel strike and not from diminished interest of users. Sales of leaded steels are increasing, with demand exceeding supply at both mill and warehouse levels. This is the consequence partly of strong activity in the metalworking industry and partly of growing recognition of the advantages of these steels in machinability.

The purpose of lead addition to steel is to increase machinability without materially changing the mechanical properties of the steel. Improved machinability ratings of base steels from 25 to 40 per cent, or even more, are a matter of record. Good distribution of the lead in these steels was a problem until Inland Steel Co. patented a new method in 1939. Although the company subsequently licensed 23 companies in the United States and Canada to use the process, production was low until comparatively recently.

60 Per Cent Boost — Output of leaded steels in this country in 1955 was estimated at 25,000 tons a month. For 1956, the estimate is 40,000 tons a month. Aside from Inland, companies producing leaded steels in largest volume are Republic Steel Corp., Jones & Laughlin Steel Corp., Youngstown Sheet & Tube Co., United States Steel Corp. and Copperweld Steel Co. Some companies, like Inland, are producing up to the capacity of their facilities and a few are increasing output or expanding their capacity to make it.

In the category of expanding facilities is Youngstown Sheet & Tube Co., which has been one of the two makers of bessemer leaded steel. In recent months, at a cost of $500,000, the company has been equipping one of its open-hearth pouring stands at its East Chicago, Ind., plant to produce 200-ton leaded heats. Trial heats were made in this furnace in June.

Availability Problem—Increase in demand for leaded steels is expected to come from expansion of existing applications rather than new markets. This is because availability of these steels isn't great enough to cultivate new uses in any extensive manner.

Leaded carbon steels are designed around screw machine applications, and it is estimated that these steels account for about half of all screw machine production today. Autos and tractors take a big share of these products. Bulk of leaded carbon steels is in the form of cold-finished bars.

Leaded alloy steels find principal uses in heavy machinery, roadbuilding equipment and machine tools. Their popularity in the maintenance field is gaining markedly. Bulk of leaded alloy analyses is in the form of hot-rolled bars.

Growing Market—A development of the past year (STEEL, Mar. 12, p. 233) is use of leaded steel plate in making rubber product molds. This application was the idea of Joseph T. Ryerson & Son Inc., and the plate was produced by Inland Steel Co. Aside from the customary free machining characteristics of leaded steels, this plate has the additional advantage of freedom from sulphide stringers. Ryerson has carried the plate in stock only about nine months and reports an active demand for it in rubber mold and kindred applications. So far, the problem is to get enough leaded plate to accommodate repeat orders of present users.

Ryerson attributes some of the increasing sales of leaded steels to the latent demand of users just now coming to the fore and to wider availability of the various products and grades. With licensees stepping up their output, more warehouses are

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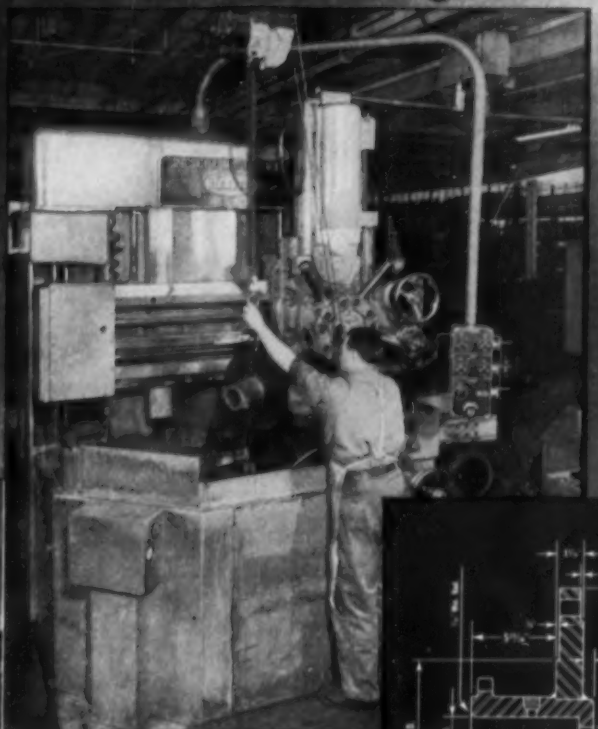
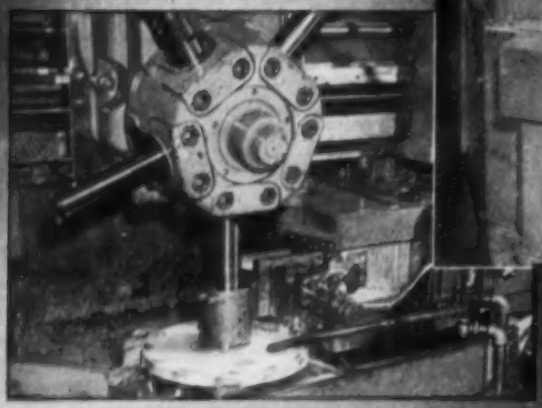
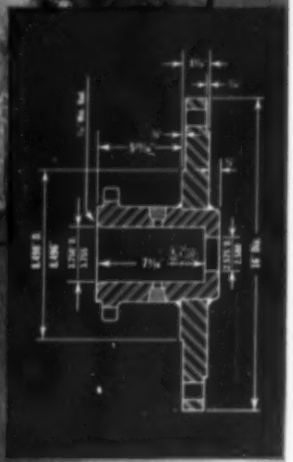
Manufacturers of fluid mixing equipment for numerous applications in industry, Mixing Equipment Co., Inc., Rochester, New York, are enthusiastic in their acclaim of the performance of their new 26" Cut Master, Model 75.







Easier loading and chucking, greater capacity and accuracy, combined with ease of operation are the factors contributing to the increase in production according to Mr. Walter Schmidt, General Foreman.

Are you interested in applying these advantages to your manufacturing processes? If so, call your nearest Bullard Representative or mail coupon to

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distributing leaded steels, and stocks are more diversified as to grades and sizes than previously.

Price Differential—At mill level, leaded carbon steels cost about $15 a ton more than conventional carbon steel, and leaded alloys cost about $20 a ton more. Warehouse prices of the leaded steels range from ¾ to 1½ cents a pound more than comparable unleaded steels. However, users find the higher costs of the leaded materials are more than offset by increased performance.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 117 & 118

Sheet steel set-asides for September and October are being stepped up sharply by the Business & Defense Services Administration for national defense requirements. Similar action is being taken for these months on other steel products, including plates and structurals.

Flat-rolled steel inventories were substantial at the start of the strike and still are considered adequate. If the strike continues another couple of weeks, consumers will begin worrying about supplies, especially hot-rolled. They are better fixed on cold-rolled, galvanized, low silicon sheets and specialties.

During the first half of July, sheet salesmen received few orders for tonnage to be delivered immediately upon termination of the strike. This would seem to indicate that inventories were substantial. It was generally estimated at the end of June that stocks were sufficient to support vacation-curtailed schedules from 30 to 45 days.

Now, however, inquiries for future shipments are picking up.

Steel Bars . . .

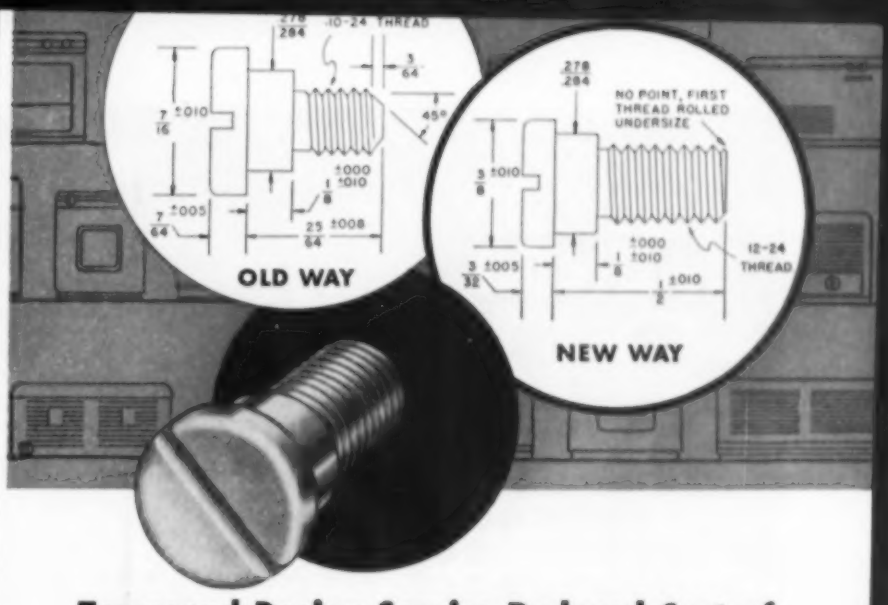
Bar Prices, Page 116

Precision Drawn Steel Co., Camden, N. J., has advanced prices on cold-drawn bars $3 a ton to $6.85 for carbon, and $7.75 for alloy.

Most cold-finishers, whether in operation or not, are accepting fourth quarter orders on the basis of prices ruling at time of delivery. Volume so far is light. Books also are open for alloy bar business. Cold-finished carbon grades, 2-in. and under, are available for prompt shipment.

Consumers' inventories are holding up, except in large rounds and flats. In New England, stocks are reported ranging up to 45 days, though they are unbalanced as to size.

Most New England consumers resumed production, following vacations, at a slower pace than in sec-



Townsend Design Service Reduced Cost of This Part from $10 to $5 per Thousand

The two parts shown above demonstrate how Townsend engineers saved an appliance manufacturer $5.00 per thousand by redesigning a special fastener so that it could be produced by cold-forming. By redesigning this part a costly machining operation was eliminated.

The shouldered screw at left, above, an integral part of a major appliance, was originally produced by another method at a cost of about $10.00 per thousand. Townsend engineers applied their extensive knowledge of cold-forming techniques to the problem and by slightly changing the design found that the part could be produced for about $5.00 per thousand—a clear savings of 50% on a part used in great volume. The new part shown at right provides just as efficient a fastener as the old.

This is a typical example of how the Townsend Technical Sales Department can help you in your efforts to improve your products and reduce assembly costs. These men can serve you in several ways—they will act as fastening consultants to your design and production engineers—they will design special parts or recommend the best standard fasteners. They often study an entire assembly procedure and suggest improved techniques.

The Technical Sales Department has back of it a company with nearly a century and a half of wire drawing and cold-forming experience. Townsend regularly produces more than 10,000 standard and special parts and fasteners—has the capacity to manufacture more than 60-million pieces a day.

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ond quarter. Forge shops in the area lag well behind capacity.

Plates . . .

Plate Prices, Page 116

Plate mills that have not been closed by the strike are being called upon by the Business & Defense Services Administration to set aside considerably more tonnage in September and October for special requirements than is now scheduled. Set-asides of one eastern mill for those two months, for example, have quadrupled.

The platemakers will have a tough task revamping quotas for third and fourth quarters.

Steel Output Records Set

Steel production set records in June, the first half of this year and in the 12 months ended June 30, reports the American Iron & Steel Institute. June production totaled 9,758,000 net tons, that for the first six months of the year was 62,644,175 tons, and that for the 12 months ended June, 122,473,958 tons.

The new June record compares with output of 9,746,467 tons in June, 1955, and with 10,490,376 tons produced in May, this year.

First half output was more than 5.4 million tons greater than that in the first six months of last year when the total was 57,206,302 tons. In the last six months of 1955, output totaled 59,829,783 tons.

The great 12-month surge of output beginning in mid-1955 included eight consecutive months of more than 10 million tons of production each. The peak monthly total was over 10.9 million tons, in March this year.

During the second quarter, output totaled 30,772,161 tons.

Prices Go Up on Refractories

Prices of refractories are rising 5 to 15 per cent. (New prices appear on p. 130.)

Pushing them up are the steel industry labor negotiations. The steel industry is the largest user of refractories, and producers of them key their wage patterns to those in the steel industry. Makers of refractories continue to operate and promise to give their men as much of an increase as the steelworkers get, and to make the increase retroactive to July 1. The price increases are made to cover the anticipated increases in labor costs.

The amount of increase depends on the type of refractory. Last price increase was made in connection with the steel wage boost in July, 1955.

Producers of refractories are taking advantage of the shutdown in the steel industry to build stocks of refractories used by the steelmakers and to catch up on shipments to other industries.

High activity in all industries using refractories has kept demand high for these materials. Needs of the steel industry will spurt upon resumption of steelmaking.

	—OPEN HEARTH—		——BESSEMER——		—ELECTRIC—		——TOTAL——	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.6	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	319,860	76.3	819,455	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,638	77.9	2,427,698	86.5	31,872,014	99.6
*Apr'l	9,437,945	102.2	366,388	77.9	779,452	84.2	10,523,785	99.7
*May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	98.2
†June	8,698,000	94.2	283,000	71.9	777,000	94.0	9,758,000	92.5
†2nd. Qtr..	27,506,112	98.2	887,378	74.4	2,378,671	84.7	30,772,161	96.2
†1st 6 Mo.	56,020,590	100.0	1,817,216	76.1	4,806,369	85.6	62,644,175	97.9
1955								
January ..	8,054,345	86.0	199,229	49.0	584,162	63.6	8,837,736	82.7
February .	7,734,884	91.5	197,091	53.7	564,989	68.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.5	666,235	72.6	9,981,754	93.4
1st Qtr. ..	24,849,255	91.4	651,813	55.2	1,815,356	68.1	27,316,424	88.0
April	8,858,549	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	305,347	75.1	715,678	77.9	10,328,316	96.6
June	8,764,430	96.6	293,544	72.0	698,493	78.6	9,746,467	94.1
2nd Qtr. ..	26,930,270	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mos.	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,232,535	88.1	268,348	66.1	600,063	65.5	9,100,946	85.3
August ...	8,600,612	91.8	298,972	73.5	745,888	84.1	9,882,325	95.7
September .	8,829,266	97.6	307,171	78.2	694,000	75.7	9,594,545	89.7
3rd Qtr. ..	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mos. ...	77,441,938	93.9	2,390,264	66.8	5,951,916	73.6	85,784,118	91.1
October ...	9,369,704	100.0	330,150	81.2	801,196	87.3	10,501,050	98.2
November .	9,141,244	100.8	306,674	77.9	799,480	89.9	10,247,398	99.0
December .	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	98.5
4th Qtr. ..	27,917,479	100.5	929,253	77.0	2,405,235	88.3	31,251,967	98.6
Last Half .	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	95.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,198 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

*Revised. †Preliminary figures, subject to revision.

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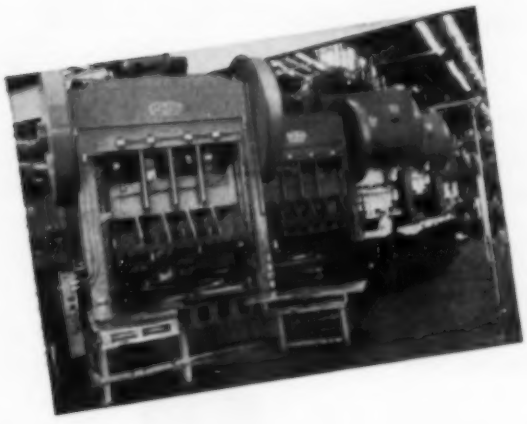

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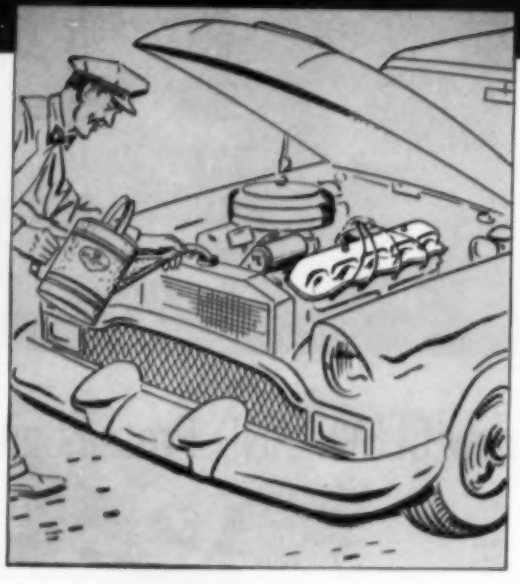

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MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C. 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P. 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D. $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contact $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.39c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.8c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max), Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (19 14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Burtam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carboriam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W. $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots, 2" x D. $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30. f.o.b. Langeloth and Washington, Pa.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $165.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, O., Hays, Pa., $145; Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $93; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $96.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $197; Philadelphia, Clearfield, Pa. $201.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $281; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $177; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis $259.45; Bridgeburg, Pa. $292.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43. ⅝-in. grains with fines: Baltimore, $66.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 66%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$32.50-33.00*
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months	*$1.35-$1.40 nom., per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.10-$1.15 nom.*

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African	
48% 3:1	*$52.00-$53.50*
48% 2.8:1	*nom. 49.00-50.00*
48% no ratio	*39.00-40.00*
South African Transvaal	
48% no ratio	*$35.00-$36.00*
44% no ratio	*25.00-26.00*
Domestic Rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of lb content, c.i.f. seaboard

55-60%	*$3.35-$3.80*
60-65%	*3.80-3.90*

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $6.50-$75.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght. allowed	
Carlots	36.00
Ton lots	38.00
Antimony, 500 lb lots	22.00*
Brass, 5000-lb lots	41.75-65.25†
Bronze, 5000-lb lots	67.50-71.75†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	62.75-65.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡

Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5¼	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Camden, N. J., ovens	26.50
Detroit, ovens	27.50
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island (Pittsburgh), Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Chicago, deld.	29.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	*$7.05*	*$7.05*	*$7.05*	*$7.45*
Bar Size Angles	*6.90*	*6.90*	*6.90*	*7.30*
Structural Angles	*7.45*	*7.45*	*7.45*	*7.85*
I-Beams	*7.65*	*7.65*	*7.65*	*8.05*
Plates	*8.90*	*8.90*	*8.90*	*9.30*
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	*7.00*	*7.00*	*7.00*	*7.40*
Hot-Rolled Bands	*7.50*	*7.50*	*7.50*	*7.90*
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	*7.80*	*7.80*	*7.80*	*8.10*

Oil Country Pipe: Mills withdrawn for remainder of the year.

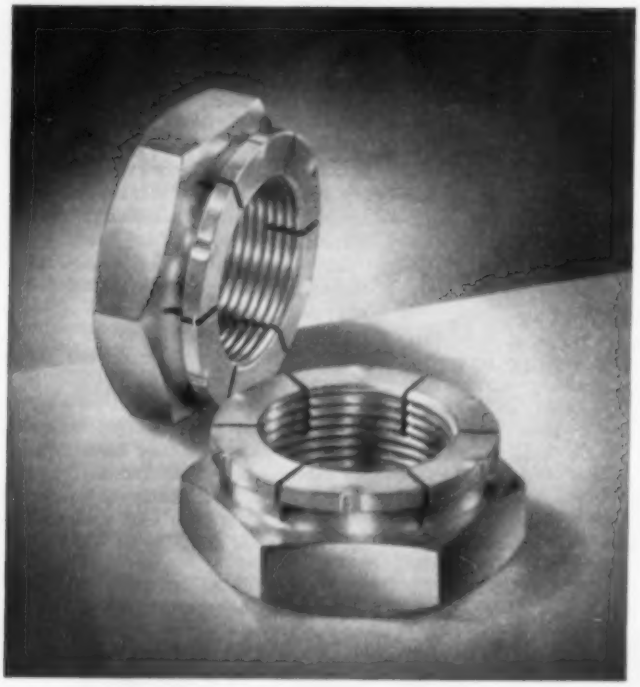
†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulfate	$32.00
Birmingham area	36.00
Cents per pound, producing point	
Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.	

Flexloc thin nuts save space, weight and production time



Self-locking nuts are 30% lower and lighter; speed up assembly with hand or power tools

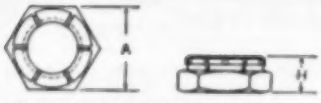
Self-locking FLEXLOC thin nuts are 30% lower than regular height locknuts of the same nominal diameter. They fit into spaces where regular height locknuts will not go. You can design lighter, more compact units with them.

Where you must reduce weight in a completed assembly, you can save by using shorter bolts with these lighter nuts. And you save production time. The length of engagement of mating threads is shorter: fewer revolutions of hand wrenches or power nut runners are needed to seat them.

FLEXLOC nuts are of 1-piece, all-metal construction. You can use a FLEXLOC fully seated as a locknut or at any point along a bolt as a stop nut. Once the threads in the resilient locking section are fully engaged, the FLEXLOC grips the mating threads with uniform locking torque wherever wrenching stops. Since there are no nonmetallic inserts to come out or deteriorate, the locking life of a FLEXLOC is virtually unlimited.

Your authorized industrial distributor stocks FLEXLOC nuts in a variety of sizes, materials and finishes. Consult him for details. Or write us for information about your special locknut problem. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

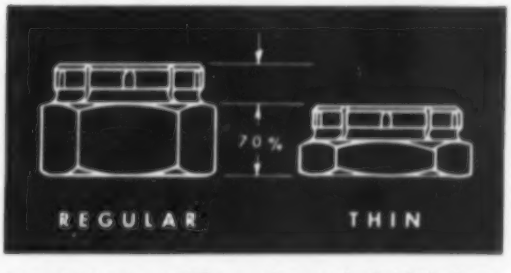
SPECIFICATIONS
FLEXLOC THIN NUTS



NATIONAL COARSE THREAD—U.S.S

SIZE	A INCHES	H INCHES	WIDTH ACROSS CORNERS	WEIGHT PER 1000 NUTS
6-32	.312	.125	.361	1.8
8-32	.344	.172	.397	2.8
10-24	.375	.172	.433	3.3
¼-20	.438	.203	.505	5.4
5/16-18	.563	.250	.649	11.6
⅜-16	.625	.265	.722	14.9
7/16-14	.750	.312	.866	24.9
½-13	.813	.312	.938	28.4
9/16-12	.875	.359	1.010	36.1
⅝-11	1.000	.391	1.155	54.1
¾-10	1.125	.406	1.299	69.2
⅞-9	1.312	.469	1.516	107.5
1-8	1.500	.563	1.732	171.6
NATIONAL FINE THREAD—S.A.E.				
6-40	.312	.125	.361	1.8
8-36	.344	.172	.397	2.8
10-32	.375	.172	.433	3.3
¼-28	.438	.203	.505	5.4
5/16-24	.500	.250	.577	8.7
⅜-24	.563	.266	.649	11.5
7/16-20	.625	.312	.722	14.9
½-20	.750	.312	.866	21.7
9/16-18	.875	.359	1.010	36.2
⅝-18	.938	.391	1.082	42.4
⅝-16	1.063	.406	1.227	54.5
⅞-14	1.250	.469	1.443	84.6
1-14	1.438	.563	1.660	136.3
1⅛-12*	1.625	.625	1.876	193.5
1¼-12*	1.813	.750	2.093	296.0
1⅜-12*	2.000	.812	2.309	389.0
1½-12*	2.187	.875	2.526	498.0

*Steel only (plain or cadmium plated) in stock sizes.



FLEXLOC thin nuts are 30% lower than regular height locknuts. There is a corresponding saving in weight. In sizes through 5/16 in., thin FLEXLOCs meet tensile strength requirements for regular height locknuts. FLEXLOC nuts can be made in the thin type because every thread, even those in the locking section, carries its full share of the load. There are no nonmetallic inserts to waste head space or weaken the structure of the nut.

Standard FLEXLOC self-locking thin nuts are available in plain or cadmium plated alloy steel, for use in temperatures to 550°F; in plain or silver plated corrosion resisting steel, for temperatures to 750°F; and in brass and aluminum, for temperatures to 250°F.

STANDARD PRESSED STEEL CO.
FLEXLOC LOCKNUT DIVISION SPS
JENKINTOWN PENNSYLVANIA

European Steel Prices Rise

Prices on steel imported from western continental European countries have further advanced, $3 to $8 a ton (see p. 130). This is in anticipation of higher prices in the United States, once the steel strike is settled, and a sufficiently increased demand in this country to make the advanced prices on imported steel stick. As time goes on and there is opportunity to judge more accurately what the increase in domestic prices will be, and what the supply-demand situation looks like, importers may quote still higher.

The first week of the general steel strike saw little activity, but since then there has been a constantly increasing volume of inquiry for imported steel. Indications are that importers will not be able to meet the demand on some products over the next few months. This appears to be especially true in plates, shapes and merchant bars; and in the case of oil country pipe, European mills have withdrawn from the market for the rest of the year.

Most major importers order ahead on the basis of regular sales volume and then service their regular customers on about four to five weeks' notice. This provides some fairly nearby tonnage for regular customers, but it doesn't allow much extra for nearby delivery; for those who are not regular customers, there is relatively little or no tonnage.

They, and also some of the regular customers, will have to count on more extended deliveries, as indicated by mill promises against new orders. Some of these promises now run almost to the end of the year—plates around five months; merchant bars, five months; deformed bars, three to four months; bar size angles, four months. Bookings of structural angles now run beyond the end of the year—six months, and I-beams, eight months in some cases. Anyone who hasn't a regular position with importers probably will have to wait some time for shipments.

Some importers doubt if European mills could increase their tentative quotas for this country during the current half by much more than 100,000 to 150,000 tons. However, this probably won't keep a lot of domestic consumers from shopping around and doing the best they can to get tonnage that might be available within the next three or four months.

Among the relatively few easy items are hot and cold sheets.

Tubular Goods . . .

Tubular Goods Prices, Page 120

A few tube mills are operating, but shipments of oil country tubing are virtually suspended. As a result, some oil drilling operations may be curtailed if the steel strike extends into August.

Users of other tubing have enough stocks for three or four weeks. Auto builders are well supplied with mechanical tubing. The armed forces, however, will need more specialty tubing soon. This is not stocked in warehouses. Pressure tubing is in strong demand due to utilities' needs.

Although most users of specialty tubing have adequate stocks for present requirements, they fear a long strike and are placing orders for delivery three months after the mills resume production.

Resellers of commercial pipe have not increased their list prices, as a general thing, but they have firmed up existing schedules. Demand is still spotty in the East. Kaiser Steel Corp., Fontana, Calif., raised prices $11 on continuous and electric weld pipe.

7 out of 9

Seven out of the nine automotive press plants built since 1946 have been completely installed by Commercial Contracting Corporation.

CCC's prompt, efficient delivery of its services—individually or in package combinations—has won industry's confidence.

Write for information

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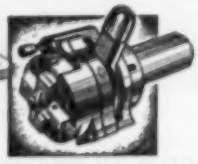

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Scrap . . .

Scrap Prices, Page 134

Philadelphia—Based on new business, prices on open-hearth grades of scrap have advanced. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are holding at $49, delivered, No. 2 heavy melting at $40 and No. 2 bundles at $38.

The market undertone continues strong, although weakness would develop were the the steel strike to be prolonged.

New York—The scrap market continues strong and steady here, except for an increase in brokers' buying prices on short shoveling turnings to $28-$29, and on low phos structurals and plate to $45-$46.

Boston—Steel scrap shipments are light to two district mills at somewhat stronger prices. Brokers' prices for district shipments have been around $2 a ton higher than for eastern Pennsylvania and other outside consuming points. Prices on cast iron grades are steady with shipments in limited volume.

Buffalo—A firmer undertone is reported in scrap here despite a lack of new business. Dealers attribute the stronger tone to new buying at higher prices in the Pittsburgh and Youngstown area. Some Buffalo scrap is expected to move to these consuming points.

There has been a reduction of $1 a ton in cast scrap. Cupola cast is quoted at $45 and No. 1 heavy machinery at $50.

Pittsburgh—Market sources think the downtrend in scrap prices has reached its low point. The market shows more strength despite the work stoppage. Optimism is based on continued buying at low prices. Mills will need a greater proportion of scrap when they resume production, because pig iron quality will be poor for several days.

Strength spreads through major steelmaking grades, cut structurals, punchings and plate scrap and electric furnace bundles. There is also renewed interest in rails.

Cleveland—Although mill buying is at a virtual standstill the scrap market here and in the Valley is showing signs of renewed strength. On the basis of brokers' offerings, prices on the steelmaking and blast furnace grades are up about $1 a ton. Expectations are there will be a strong demand for scrap immediately upon termination of the strike and supplies are reported not too plentiful in view of curtailed manufacturing operations due to vacations the past few weeks.

St. Louis—Scrap is scarcely moving here. Prices showed a tentative spurt during the last week. Most grades were up, rises ranging from $1 to $7 a ton. Mills are not getting enough shipments. Slowness is a result of weather, which curtails scrap gathering, vacation time and the strike which immediately produced a slash in prices. But mills here and in Peoria are operating and need material. Peoria raised prices and local mills are meeting that competition.

Chicago—A firm tone in scrap is evident despite the low volume of consumer buying. Mills which are operating continue to buy but pretty much at the current market. There is more interest in No. 2 heavy melting steel and for the second consecutive week the quotation has moved up $1 a ton.

Scrap generation is at low ebb now with many manufacturing plants down for vacation, and the majority of dealers have curtailed their collection activities.

Cincinnati — Prices on foundry grades of scrap moved upward $1 a ton last week following a like movement in prices on the open-hearth grades in the preceding week. Foundries serving the machine tool industry are at near-capacity level. Dealers report continued dullness in scrap intake.

Birmingham — Some open-hearth scrap is moving from the Carolinas and Georgia to northern mills that have not been closed by the strike. Supplies in dealers' yards are limited and little tonnage is coming in. Consequently, brokers are meeting with some difficulty in filling even limited orders.

Seattle—The domestic scrap market is inactive. Exports are moving steadily, however. Published prices are nominal. Dealers are ac-

(*Please turn to page* 136)

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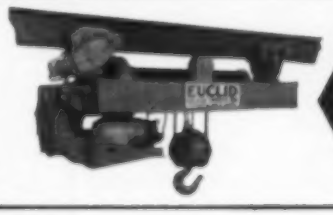

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WRITE FOR CRANE CATALOG

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 18	$46.50
July 11	45.50
June Avg.	46.04
July 1955	39.67
July 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	*52.00-53.00*
Heavy turnings	42.00-43.00
Punchings & plate scrap	*52.00-53.00*
Electric furnace bundles	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	44.00-45.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	51.50-52.50
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	61.00-62.00
Railroad specialties	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	360.00-375.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*41.00-44.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*41.00-44.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*41.00-44.00*
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Low phos.	*46.00-47.00*
Cut structural plates 2 ft and under	*52.00-53.00*
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	*41.00-44.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Charging box cast	38.00-39.00
Heavy breakable cast	42.00-43.00
Stove plate	49.00-50.00
Unstripped motor blocks	27.00-28.00
Brake shoes	37.00-38.00
Clean auto cast	50.00-51.00
Burnt cast	37.00-38.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
R.R. malleable	54.00-55.00
Rails, 2 ft and under	62.50-63.50
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	57.00-58.00
Cast steel	51.00-52.00
Railroad specialties	51.00-52.00
Uncut tires	52.00-53.00
Angles, splice bars	57.00-58.00
Rails, rerolling	61.00-62.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*27.00-28.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Low phos.	*46.00-47.00*
Electric furnace bundles	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00

CHICAGO

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	*38.00-39.00*
No. 1 factory bundles	48.00-49.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	33.00-34.00
No. 1 busheling	44.00-45.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	52.00-53.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	*40.00-41.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Angles, splice bars	62.00-63.00
Rails, rerolling	67.00-68.00

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	*52.50-57.50*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00
No. 2 heavy melting	32.00
No. 1 bundles	42.00
No. 2 bundles	29.00
No. 1 busheling	40.00
Machine shop turnings	23.00
Mixed borings, turnings	23.00
Short shovel turnings	27.00
Punchings & plate scrap	*58.00*

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	25.00
Clean auto cast	51.00
Malleable	51.00

BIRMINGHAM

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Cast iron borings	20.00-21.00
Short shovel turnings	27.00-28.00
Machine shop turnings	25.00-26.00
Electric furnace bundles	*41.00-42.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.50-49.50
Stove plate	47.00-48.00
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft	49.00-50.00
Unstripped motor blocks	37.50-38.50
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18-in. and under	59.00-60.00
Rails, rerolling	64.00-65.00
Rails, random lengths	54.00-55.00
Angles, splice bars	54.00-55.00

PHILADELPHIA

No. 1 heavy melting	*49.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*49.00*
No. 2 bundles	*38.00*
No. 1 busheling	*49.00*
Electric furnace bundles	*52.00*
Mixed borings, turnings	34.00
Machine shop turnings	*32.00-34.00*
Short shovel turnings	*37.00-38.00*
Heavy turnings	44.00
Structurals & Plates	*52.00-53.00*
Couplers, springs, wheels	*61.00*
Rail crops, 2 ft & under	64.00

Cast Iron Grades

No. 1 cupola	48.00
Malleable	*65.00-67.00*
Heavy breakable cast	52.00
Drop broken machinery	54.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	41.00-42.00
No. 2 bundles	31.00-32.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	*28.00-29.00*
Low phos. (structural & plate)	*45.00-46.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	32.00-34.00
Heavy breakable	44.00-45.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*38.50-39.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	*38.50-39.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	42.00-42.50
Mixed cupola cast	37.50-38.00
No. 1 machinery cast	43.50-44.00

BUFFALO

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Mixed borings, turnings	27.00-28.00
Machine shop turnings	25.00-26.00
Short shovel turnings	28.00-29.00
Cast iron borings	27.00-28.00
Low phos.	50.00-51.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*44.00-45.00*
No. 1 machinery	*49.00-50.00*

Railroad Scrap

Rails, random lengths	54.00-55.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	50.00-51.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	43.00-44.00
No. 2 bundles	31.00-32.00
No. 1 busheling	43.00-44.00
Machine shop turnings	25.50-26.50
Mixed borings, turnings	28.50-29.50
Short shovel turnings	30.50-31.50
Cast iron borings	28.50-29.50
Low phos., 18 in.	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	*44.00-45.00*
Charging box cast	*44.00-45.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 18 in. and under	*66.00-67.00*
Rails, random lengths	*59.00-60.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*39.50*
No. 2 heavy melting	*37.00*
No. 1 bundles	*40.00*
No. 2 bundles	30.00
No. 1 busheling	*40.00*
Machine shop turnings	*24.00*
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	*37.00*
Heavy breakable cast	*37.00*
Unstripped motor blocks	*32.00*
Brake shoes	*45.00*
Clean auto cast	*46.00*
Stove plate	*39.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00*
Rails, 18 in. and under	62.00
Rails, random lengths	*56.00*
Rails, rerolling	69.00
Angles, splice bars	55.00

SEATTLE

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	30.00-31.00
No. 3 bundles	20.00
Machine shop turnings	23.00-25.00
Mixed borings, turnings	23.00-25.00
Electric furnace No. 1	52.00-54.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Heavy breakable cast	36.00-38.00
No. 1 wheels	37.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	30.00-31.00
Brake shoes	38.00

Railroad Scrap

Rails, random lengths	43.00-44.00

LOS ANGELES

No. 1 heavy melting	41.00
No. 2 heavy melting	37.00
No. 1 bundles	40.00
No. 2 bundles	30.00
Machine shop turnings	21.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00

SAN FRANCISCO

No. 1 heavy melting	43.00
No. 2 heavy melting	40.00
No. 1 bundles	42.00
No. 2 bundles	35.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Heavy turnings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Stove plate	39.00
Heavy breakable cast	39.00
Unstripped motor blocks	38.00
Brake shoes	35.00
Clean auto cast	48.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	40.00
No. 2 bundles	35.50
Mixed steel scrap	37.00
Busheling, new factory:	
Prepared	41.00
Unprepared	37.00
Short steel turnings	20.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

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(Concluded from page 133)

cumulating some tonnage, but seasonal conditions limit inventories.

Los Angeles—The market is quiet. Most dealers anticipate a long strike and resulting depressed prices. Some dealers are hopeful exports will increase.

San Francisco—Export demand and buying by one mill still operating in the area have absorbed about all the incoming steel scrap shipments. As a result, the price tone is firm.

Pig Iron . . . .

Pig Iron Prices, Page 121

Alan Wood Steel Co., producer of pig iron at Swedeland, Pa., advanced prices $2.50 a ton to $64.50 for basic, $65 for No. 2 foundry, $65.50 for malleable and $66 for bessemer at the furnace. Swedeland's Philadelphia delivered prices on these grades are, respectively, $66.26, $66.76, $67.26 and $67.76.

Demand is light, reflecting the inventory buildup which most foundries accomplished in June and the drop in melting operations at foundries due to extensive closings for vacations.

Inland Steel Co.'s No. 6 blast furnace at Indiana Harbor, Ind., blown out for relining May 4, was ready to go back into production early in July but was held out because of the strike.

The Mystic furnace in New England is resuming production this month after a seven-month suspension for relining and rebuilding.

Iron Ore . . .

Iron Ore Prices, Page 130

The movement of iron ore on the Great Lakes has been slowed to a trickle by the steel strike. Only 56 of the 255 ore carriers in the American lake fleet were in service last week.

Shipments of ore on the lakes in the week ended July 16 totaled only 340,977 tons, reports the Lake Superior Iron Ore Association. This compared with 3,068,963 in the like week of 1955.

Cumulative shipments to July 16 totaled 33,189,985 tons. In the 1955 season to July 16, shipments amounted to 34,556,266 tons.

Warehouse . . .

Warehouse Prices, Page 121

Distributors in most districts have advanced prices; others are preparing revised schedules. Prices generally are up $10 a ton on hot-rolled products and $5 a ton on cold-rolled sheets. Stainless steel prices are up $60 per

ton and those for tubing, 5 per cent in most districts.

The advances reflect the upward revisions being posted by mills which are not strike-bound as well as anticipated revisions by the rest of the industry. Other cost factors are increasing, distributors say.

Demand is improving, although there is no great pressure except for plates and shapes. Distributors are allocating tonnages of these products among their regular customers. They expect pipe, hot-rolled bars and galvanized sheets to be the next items on the critically short list if the strike is prolonged.

Structural Shapes . . .

Structural Shape Prices, Page 116

Structural fabricators not already closed by the steel strike are eating into their steel inventories rapidly. Indications are most shops will be forced to suspend operations shortly for lack of balanced steel stocks.

Government set-asides for September and October are being increased. The entire wide flange beam production those two months of a western mill, for instance, has been earmarked by Washington. Delivery schedules will have to be revised considerably, even affecting projects set up for the distant future.

The further off some projects are scheduled, the less likelihood of extended delays. Consequently, some jobs involved in long-range planning programs are being placed today on a firm delivery basis.

State highway departments in New England are checking the volume of bridge tonnage set back by the strike. Scores of spans will be delayed. Only a trickle of standard structurals is available at premium prices.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,085 tons, superstructure, state bridge over the Hudson between Albany and Rensselaer counties, New York, to Harris Structural Steel Co., New York.

6890 tons, also 1000 tons of reinforcing steel, section 6-C, Calumet Skyway toll bridge across the Calumet river from Avenue N to 98th street, Chicago, for the City of Chicago, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

7344 tons, section 2-B-2, Calumet Skyway toll bridge, 75th street to Dante avenue, Chicago, for the City of Chicago, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

5500 to 6000 tons, unit No. 2, Eddystone power plant, Philadelphia Electric Co., Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.

2085 tons, 10 grade separation structures, one railroad and one stream-crossing, Connecticut turnpike project 328-01, Ledyard-Griswold-Plainfield, to Bethlehem Steel Co., Bethlehem, Pa., through M. A. Gammino Construction Co., Providence, R. I., and Brunalli Construction Co., Southington, Conn., joint general contractors.

950 tons, junior-senior high school, New Orleans, to Orleans Material & Equipment Co., New

Still In Plant

Will Be Sold on Location

54" Bullard Vert. Turret Lathe w/Turret & Side Head

Niles 36" Vert. Turret Lathe, 2 Motor Drive—Late

#4 Cinc. Plain Dial type Mill—1941

60" x 60" x 24' Niles Planer—dbl column Box Table w/D.C. variable Spd Drive

Openside Heavy duty D & H. 72" x 60" x 22', 3 Motor Drive, Box Table, Power rapid traverse, worm drive

16" x 120" Landis Cyl. Grind. 35 HP Work Head

Southwark Initial Roll 13'-6"—Late

1A W&S w/bar feed—over 700,000 serial No., motor driven power feed att.

#3 H&J 12' Roll 2 motor drive pyramid Drop-end

14" & 16" x 36" Nortons Hyd. Cyl.—Late

5" Barret Boring Mill w/outboard support and Steady Rests

Cinc. Planer 36" x 19' Motor on Cross Rail —Late

10" x 72" & 10" x 120" Landis—Hyd. Cyl. Grdr.—1943

Jackson Vertical Die Sinker Table 18" x 72"—Late

S&S Machinery Co.

140 53rd St., Brooklyn 32, N.Y.

HYacinth 2-7400 Mr. Jay B. Srybnik

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Progressive southwestern foundry seeks steel castings sales engineer with background of productive experience. Man sought is probably now top bracket salesman or assistant executive with promotion blocked by senior many years away from retirement. This is an unusual career opportunity for graduate engineer with superior qualifications, outstanding record and demonstrated capacity for executive development. Apply in own handwriting enclosing complete biographical information and recent photograph.

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MANUFACTURERS' REPRESENTATIVE seeking additional line of fine quality railroad equipment or products and steel mill machinery or equipment. Widely known. 25 years' experience as sales executive with large manufacturing firm supplying railroad and steel industries. Principal territory Mahoning and Shenango Valleys from Pittsburgh to Cleveland.

Reply P. O. Box 64 Youngstown 1, Ohio

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All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

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Unless otherwise indicated, the following items are C-1010 Cold Rolled Strip Steel, slit edge, ¼ hard, in coils.

Size	Quantity
.012" x 2-¼"	184 #
.016" x 1⅛"	1460 #
.025" x 1-⅝"	188 #
.0359" x 5-¼" (10' lengths)	1011 #
.037" x 1-⅜"	497 #
.040" x 2-¼"	1240 #
.043" x 1-⅝"	180 #
.044" x 1"	398 #
.045" x ⅝"	60 #
.045" x ⅞"	77 #
.050" x 1-⅝"	75 #
.050" x 1"	651 #
.050" x ⅝"	156 #
.057" x 1-¼"	120 #
.062" x ⅝"	158 #
.057" x ⅞"	172 #
.055" x 1-⅛"	222 #
.0598" x ⅛"	523 #
.060" x ⅝"	906 #
.060" x ⅛"	704 #
.060" x 1-¼"	2657 #
.060" x 1-⅛"	880 #
.062" x ⅞"	342 #
.062" x 2-¼"	3804 #
.062" x ¼"	291 #
.065" x 3"	268 #
.065" x ⅞"	388 #
.070" x .951"	4042 #
.0747" x 2-⅜"	222 #
.080" x ⅝"	324 #
.082" x ⅝"	1200 #
.090" x ⅝"	12553 #
.094" x ⅝" (Round Edge)	2619 #
.094" x ⅝"	525 #
.020" x ⅛" (Spring Temper)	629 #
.025" x ⅛"	701 #
.020" x .918-.923"	6298 #
.032" x ⅝" (Soft)	1155 #
	57760 #

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MESTA 3000 TON HYDRAULIC FORGING PRESS, bed 5' LR x 36" FB. Daylight 111" 36" stroke. Fully equipped, 4 column type, 17" column. Now setup in Navy plant. Recently rebuilt. Price $$$,500.

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Attn. Mr. George T. Dexter

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TOOTH SPACING

• 99% of gear drawings do not specify tooth spacing. For most applications, industry generally believes that competent gear manufacturers, working by standard AGMA practices, will produce gears within the limitations required for easy assembly and good load transmission.

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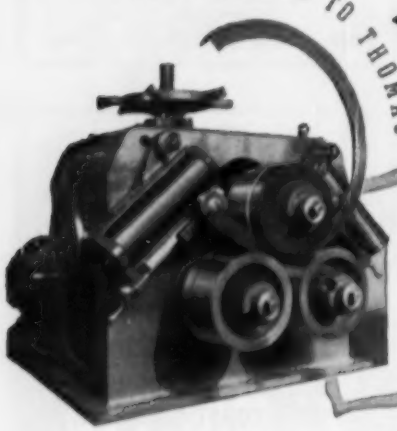
THE TREND IS TO THOMAS

For ANGLE-BENDING



IT'S A "MUST" FOR PRODUCTION BENDING

IF your production calls for circles or segments from angles, flats, rounds or other shapes in quantities, the THOMAS ANGLE BENDER may be the solution to *your* need for *greater production at less cost!*

BULLETIN 314
describes the four sizes and is yours for the asking. Write for it now!

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MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

50

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

Orleans; J. A. Jones Construction Co., Shreveport, La., general contractor.

190 tons, elementary school, Providence, R. I., to Providence Iron & Steel Co., Providence, R. I.; E. Turgeon Construction Co. Inc., Providence, is general contractor.

110 tons, hangar shop, Hanscomb Air Force Base, Bedford, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Poorvu Construction Co., Boston, general contractor; reinforcing bars to the Concrete Steel Co., Boston.

105 tons, two state bridges, Coventry, Conn., to McDermott Steel Specialties Inc., New Haven, Conn., through Charter Oak Construction Co., Hartford, Conn.; 55 tons of reinforcing to Joseph T. Ryerson & Son Inc., Boston.

STRUCTURAL STEEL PENDING

2000 tons, Pierce county-City building, Tacoma, Wash.; general contract to MacDonald Building Co., Tacoma, general award at $4,845,720.

670 tons, high school, Dallastown, Pa., Ritter Bros., Harrisburg, Pa., low on general contract.

500 tons, Torresdale filtration plant, Philadelphia; bids closed.

100 tons plus, eight steel I-beam bridges in Alaska; Westward Constructors and Gateway Inc., Anchorage, Alaska, joint low at $225,846 to Juneau, Alaska.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3438 tons, addition to Seattle viaduct, to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison-Knudsen Co. and Rumsey & Co., Seattle, joint general contractors.

970 tons, eight grade separation structures and four box culverts, Connecticut turnpike project 327-01, Norwich-Lisbon, to Plantations Steel Co., Providence, R. I., through M. A. Gammino Construction Co., Providence and Brunalli Construction Co., Southington, Conn., joint general contractors; also 715 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

305 tons, Courthouse and jail, Spartanburg, S. C., to Southern General Fireproof Co., Atlanta, through West Building Co., Winston-Salem, N. C., general contractor.

210 tons, elementary school, Providence, R. I., to Plantations Steel Co., Providence; E. Turgeon Construction Co. Inc., Providence, general contractor.

185 tons, service training school, Travelers Insurance Co., Hartford, Conn., to Fireproof Products Co. Inc., New York, through George A. Fuller Co., Boston, general contractor.

REINFORCING BARS PENDING

700 tons, County-City building, Tacoma, Wash., general contract placed.

500 tons, 8-story addition to men's dormitory, University of Washington, Seattle; Sellen Construction Co., Seattle, is low at $1,418,484.

160 tons, Washington state overcrossing, Ft. Lewis; Woodworth & Co., Tacoma, Wash., general contract awarded at $117,376.

135 tons, Washington state Yakima county bridge; bids to Olympia, Wash., July 31.

116 tons, Washington state Thurston county slab bridge; general award to John E. Alexander, Seattle, low at $184,520.

PLATES . . .

173 tons steel piling, second unit of the Seattle viaduct, to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, general contractor.

PIPE . . .

CAST IRON PIPE PENDING

200 tons, 20-in. submarine crossing Mercer Island water supply line, Seattle; also unstated tonnage of mesh, lining, etc., for 3-mile 24 and 30-in. line; general contract awarded by Seattle to Harbor Construction Co., Seattle, at $529,779.

RAILS, CARS . . .

RAILROAD CARS PLACED

Erie, 300 seventy-ton steel gondolas to Greenville Steel Car Co., Greenville, Pa.

Virginian, 1000 seventy-ton steel hoppers to its Princeton, W. Va., shops.

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HAND PROTECTION

Measure glove cost by PERFORMANCE . . . not PRICE!

The difference between *first costs* and *replacement costs* is the difference between ordinary work gloves and Jomac Gloves. While bargain buys are wearing out and are being replaced, sturdy Jomacs are being used, cleaned or reconditioned, and reused again and again. Jomac quality means better service, longer life, lower *net* costs.

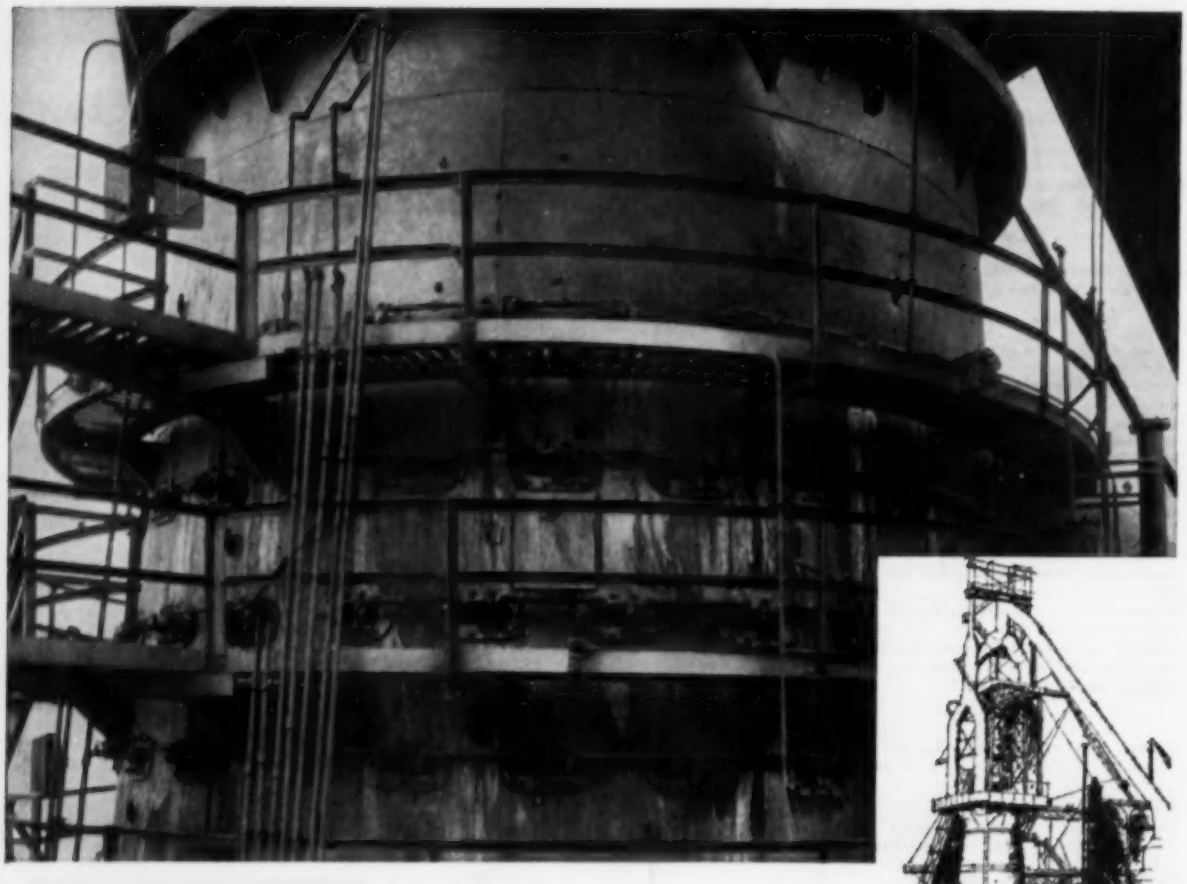
SAVE with JOMACS

Jomac manufactures all types of hand and forearm protection — all made from famous loop-pile Jomac Cloth. This porous fabric cushions hands against sharp metal, insulates them against extreme heat. Get full details. Write for the new Jomac Industrial Work Gloves Catalog. Jomac Inc., Dept. E, Phila. 38, Pa.

JOMAC

INDUSTRIAL WORK GLOVES

PROOF that quality means economy



Why Airco 78E electrodes were selected to weld blast furnace "R"

A large eastern steel producer planned to build the giant blast furnace designated "R". Welding – with its obvious advantages of speed and economy – was naturally selected as the best method of construction.

But – which electrode would best do the job? These were the factors involved in making a decision:

(1) Quality of weld deposit. Welds had to be leakproof to contain the 15 lb. psi pressure in the vessel. **(2)** High ductility and tensile strength were of prime consideration. **(3)** An all-position electrode was absolutely essential.

The Airco 78E electrode answered all these qualifications. Therefore, it was the logical choice. A total of 13,500 pounds of Airco 78E electrodes were used to weld the structure.

In building a blast furnace – or rebuilding an engine housing – Airco's Electrode Pocket Guide can help you take the guess work out of selecting the right electrode for the job. This 44-page booklet contains neatly condensed descriptions, applications and procedures – plus charts and graphs – for using the complete Airco line of electrodes.

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welding AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

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Offices and dealers in most principal cities

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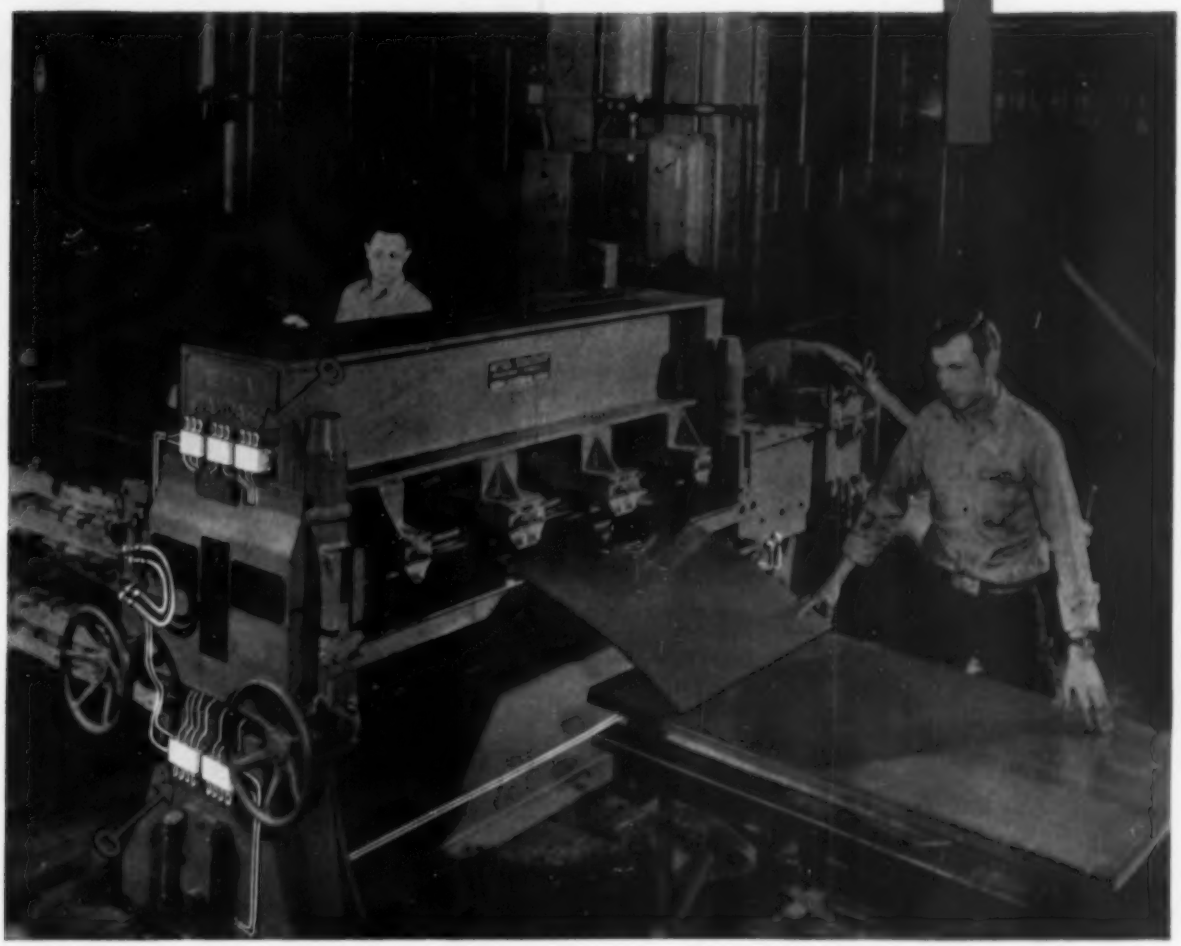
Continuous, high-speed sheet levelling calls for continuous, precision lubrication

FARVAL—
Studies in Centralized Lubrication
No. 192



● Wherever high speed and heavy shock loads are involved, adequate lubrication of bearings is a must. It can't be a hit-and-miss proposition—there's too much at stake with costly machines and continuous production lines. The operation above is a good example. Here an Aetna-Standard sheet leveller flattens sheets at high speed. Failure or inaccuracy interferes with succeeding forming and stamping operations. With Farval on guard, such eventuality will not occur.

Farval delivers a measured amount of clean lubricant to every bearing at regular intervals. No bearings are ever missed—and the amount delivered to any bearing can be varied without affecting the rest of the system. Farval saves production hours, maintenance, labor.

Ask, now, for a free lubrication survey. Let us send one of our lubrication engineers to inspect your plant equipment. Without obligation, he will present a written analysis of what Farval can do for you. Write the Farval Corporation, 3270E. 80th St., Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

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Wherever you can see these Farval manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.

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FARVAL
CENTRALIZED SYSTEMS OF LUBRICATION

HOT STRIP MILLS

SIX FINISHING STANDS OF THE MESTA 60" FOUR-HIGH HOT STRIP MILL OPERATING AT ARMCO STEEL CORPORATION, TRENTON, MICHIGAN

Designed and Built by MESTA

Designers and Builders of Complete Steel Plants

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PITTSBURGH, PENNSYLVANIA

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